SEQUAL

Report of the Meteorological Station at St. Peter and St. Paul Rocks (1983 - 1984)

LDGO-86-3

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY
OF COLUMBIA UNIVERSITY
PALISADES, NEW YORK
1986

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Silvia L. Garzoli
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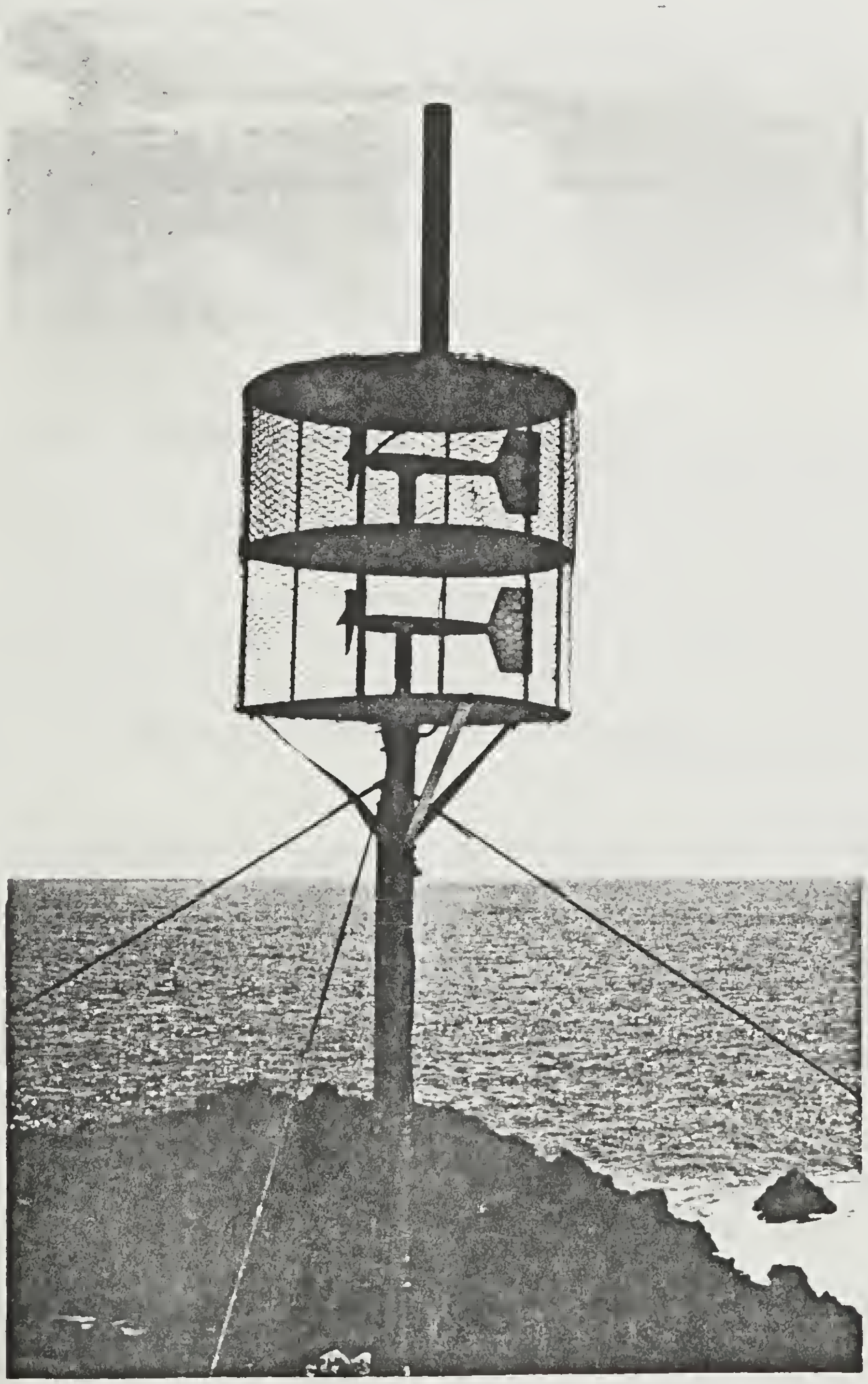
This report is a presentation of the meteorological station data from St. Peter and St. Paul Rocks during the SEQUAL experiment, 1983 and 1984. The location of the rocks (0°55´N 29°21´W), an outcrop of the Mid-Atlantic Ridge 1000 kilometers from the nearest landfall, is an ideal location to measure unobstructed winds in the equatorial Atlantic. The first station at this location was installed there as part of the FGGE experiment (see Garzoli, S. L., E. J. Katz, H. J. Panitz and P. Speth, *In situ wind measurements in the equatorial Atlantic during 1979*, Oceanologica Acta, **5**, 281-288, 1982.) The present installation was designed for SEQUAL by Richard Nowak (WHOI) and has been refined and partially redesigned by Esteban Draganovic (L-DGO) and Miguel Maccio (L-DGO). It became operational on February 12, 1983 and consists of two anemometers mounted orthogonally in an aluminum cage and an atmospheric pressure transducer at its base. The cage was wrapped with a chicken wire net in order to prevent nesting by native birds, and mounted on a 4 meter pole, the base being approximately 24 meters from the mean sea level. The pressure transducer, electronics and batteries were enclosed in a sealed and a vented case, respectively, at the base of the tower.



The wind recorder at St. Peter and St. Paul Rocks (January 1984).

The station received three scheduled major overhauls. Battery exhaustion induced by system malfunction neccessitated two unscheduled visits. During the scheduled overhauls the anemometers and batteries were replaced with new ones and the electronics with either new or refurbished units. The antenna was replaced in January 1984, from a crossed yagui array to a vertical volute. In September 1984, the battery configuration was altered so that a tape drive malfunction would not interfere with the main power source which could then drive the satellite transmission.

Following is a brief history of the station;

1982

Nov: installation on the 14th and 15th
FOCAL I cruise, N/O Capricorne

1983

Feb: start of station operation on the 12th
SEQUAL I cruise, R/V Conrad 24-1

Sep: scheduled overhaul with only partial battery replacement
SEQUAL II cruise, R/V Knorr 104-3

Nov: battery failure, data acquisition stops on the 20th

1984

Jan: unscheduled repair, data acquisition resumes on the 23rd
FOCAL cruise, N/O Capricorne
batteries replaced and vertical volute antenna installed

Jun: battery failure due to tapedrive malfunction, data acquisition stops on the 11th

Jul: unscheduled repair, data acquisition resumes on the 26th
private ship transportation
batteries replaced
transmission to GOES failed during first week

Sep: scheduled overhaul
SEQUAL IV cruise, R/V Gyre 84G10
power supply converted to dual system
Sea-Data cassette failed during first week

1985

Oct: scheduled overhaul
TOGA I cruise, R/V Endeavor 136

The anemometers were sampled continuously and wind speed was vector averaged over a one hour period. The atmospheric pressure was averaged over each hour. All the data were recorded on a Sea-Data cassette every hour. Every three hours all the data, the battery voltage and the platform status were transmitted to the USA via the GOES system. The data were collected, processed and analyzed at the Lamont-Doherty Geological Observatory.

Only data from the bottom sensor were fully processed since there was little variation in the two data sets and the data from the bottom sensor was the more complete. Data from the top sensor were used to complete the bottom sensor data set when possible. Cassette data were used, when available, to fill gaps in the GOES data set. When there were no cassette records with which to correct gaps or the data was obviously spurious, one of two methods was employed to complete the time series. A linear interpolation was performed if only one or two hours were missing. For longer periods of missing data, values 24 hours before and 24 hours after were used for interpolation purposes. In some instances it was necessary to use data from more than one day away.

The data from the first deployment had a unique problem requiring adjustment of the entire data set. Due to a software error, the time interval was only 59.72 minutes. Therefore, the entire data set was interpolated to fall on the hour. This problem was corrected before the next deployment.

The data are presented in two parts for the years 1983 and 1984. The oceanographic convention is used, direction is where the wind is going, and a correction for magnetic north deviation (magnetic variation) of -21.65° has been applied. All plots are of hourly data, except the stick plots which are of daily averaged data. Each part consists of a one year stick plot (meters/sec) and one year plots for pressure (millibars), velocity (meters/sec), North/South component (meters/sec) and East/West component (meters/sec). These plots are followed by four plots for each month of pressure, velocity, the North/South component and the East/West component.

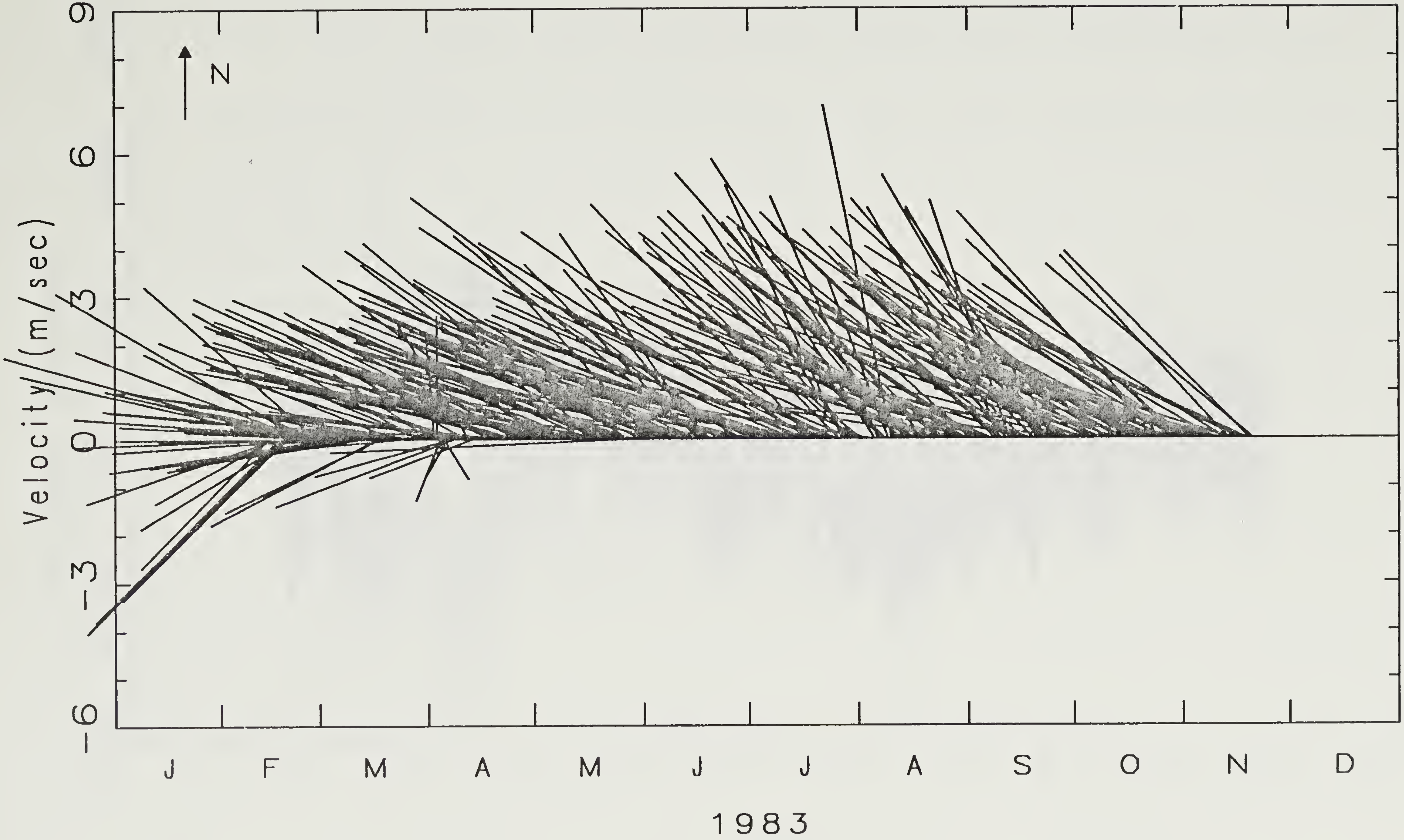
The Brazilian Government is gratefully acknowledged for granting permission for installation of the station. Drs. Philipe Hisard and Christian Henin were the chief scientist during the FOCAL cruises on the N/O Capricorne. The success of this program is indebted to many people, among them the officers and crews of:
R/V Conrad
R/V Knorr
N/O Capricorne
R/V Gyre
R/V Endeavor

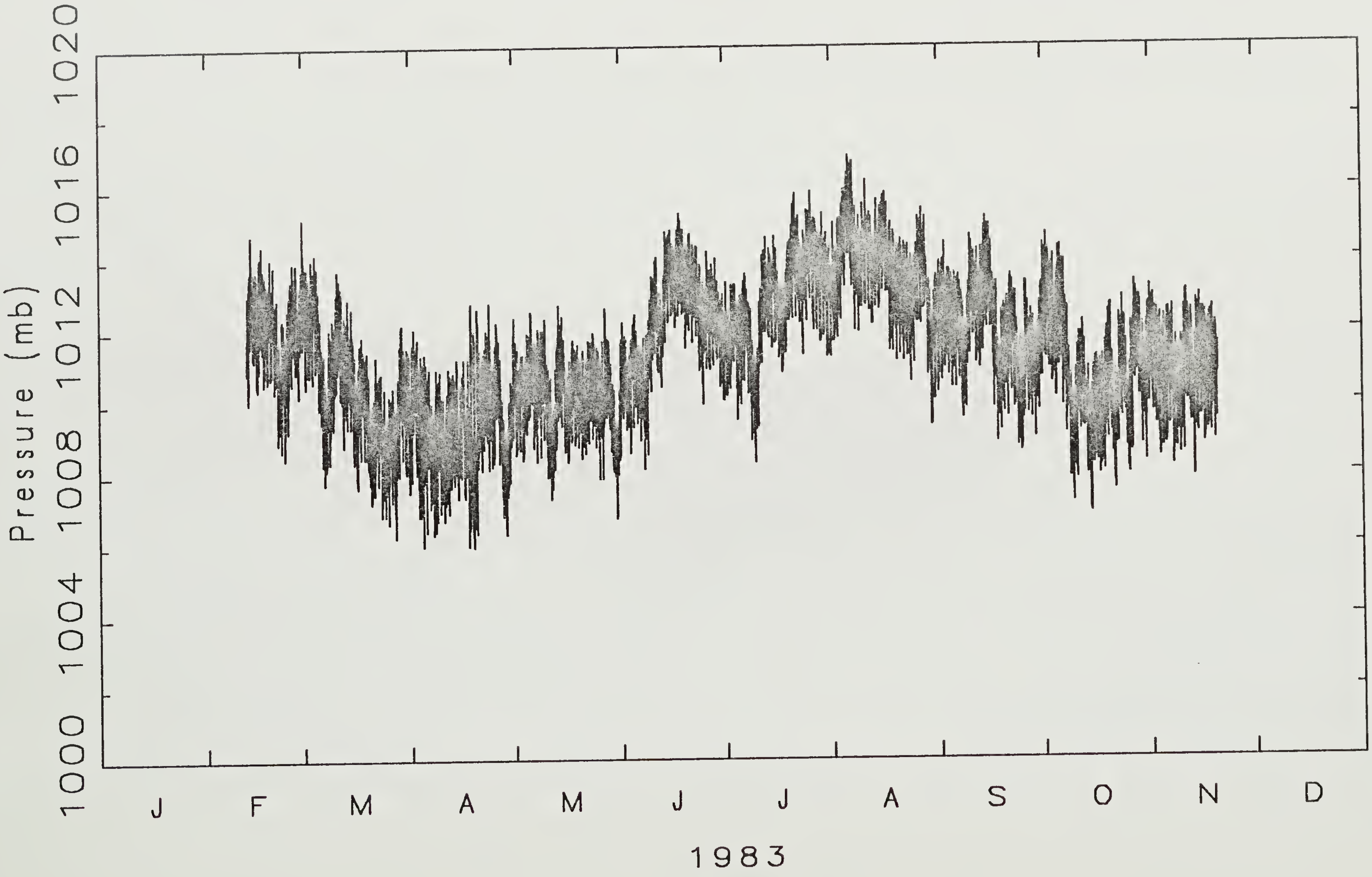
Funding for this experiment was provided by NSF grant OCE-82-09892. This report was produced with funds provided by NSF grant OCE-85-15632.

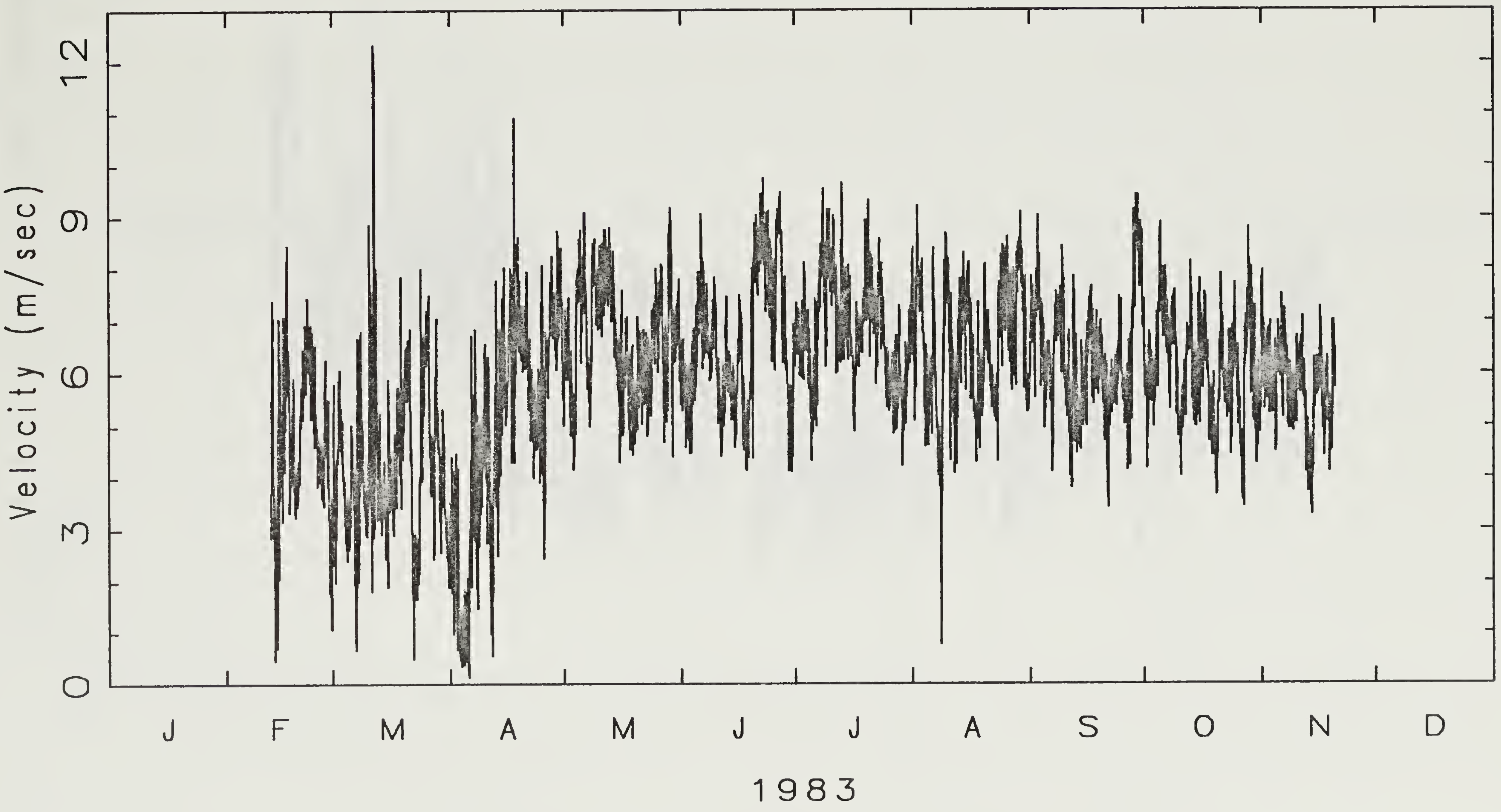
1983

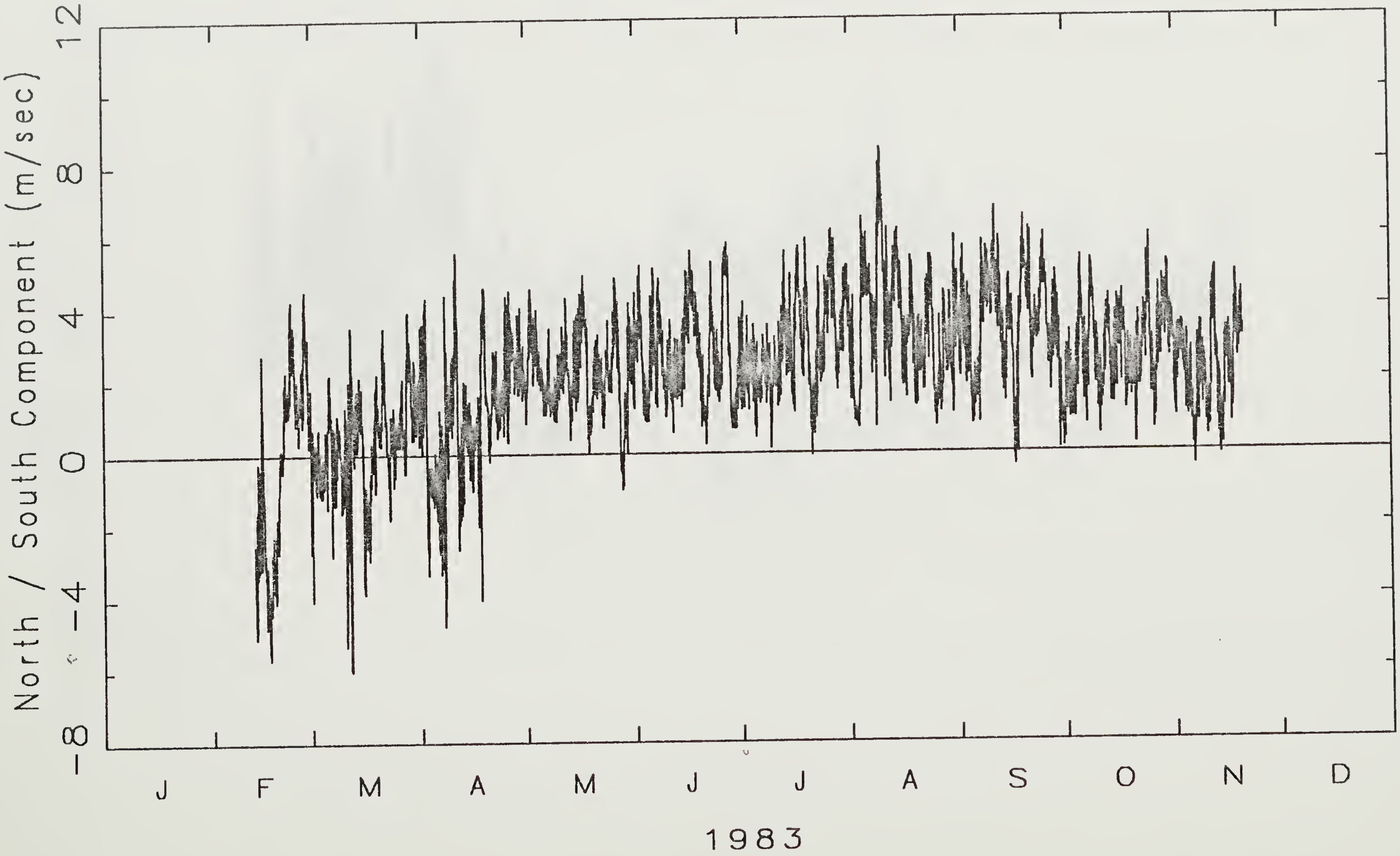
February 12 to November 20

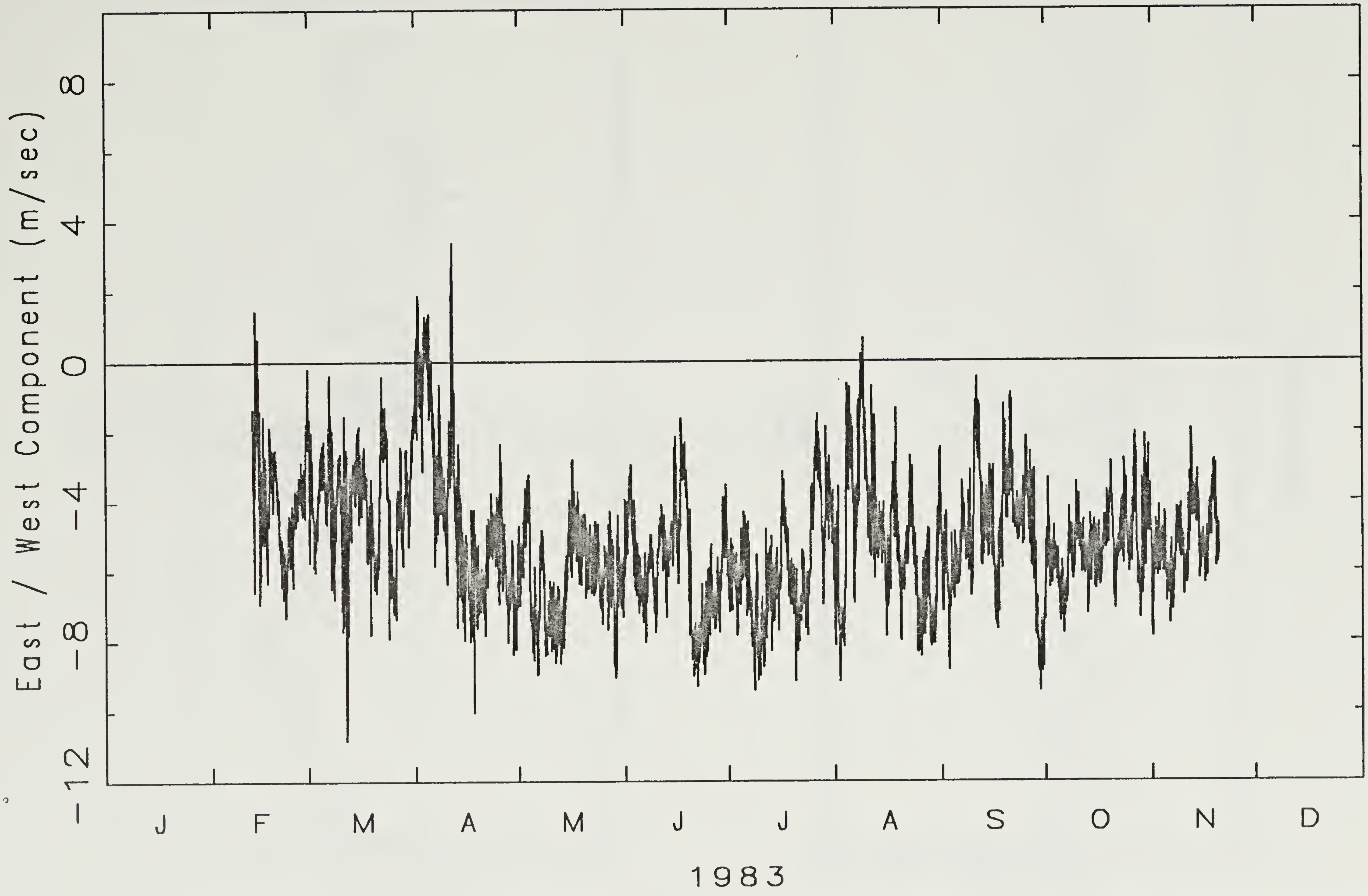
1983



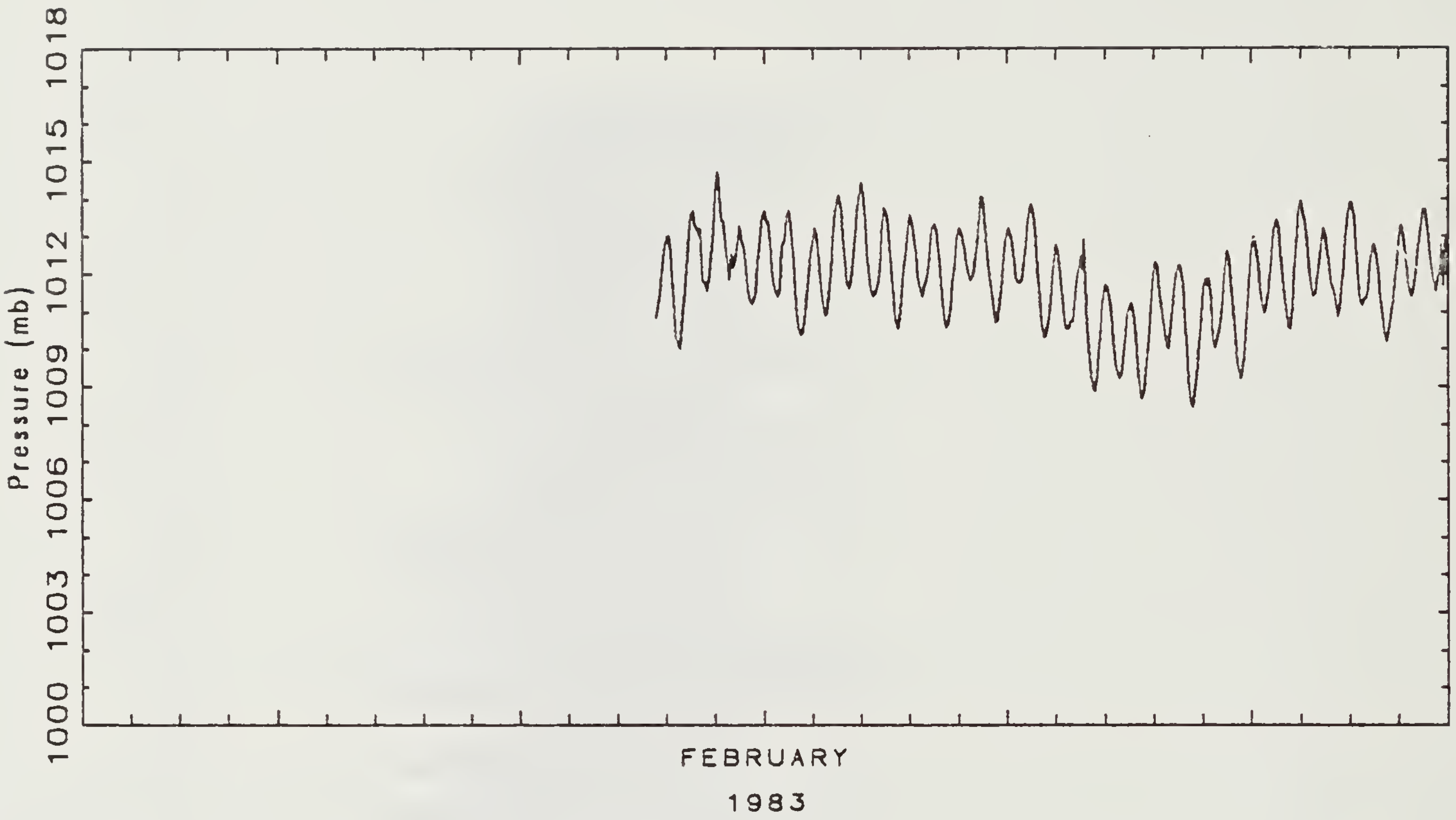

Pressure (mb)
1000
1004
1008
1012
1016
1020
J
F
M
A
M
J
J
A
S
O
N
D
1983

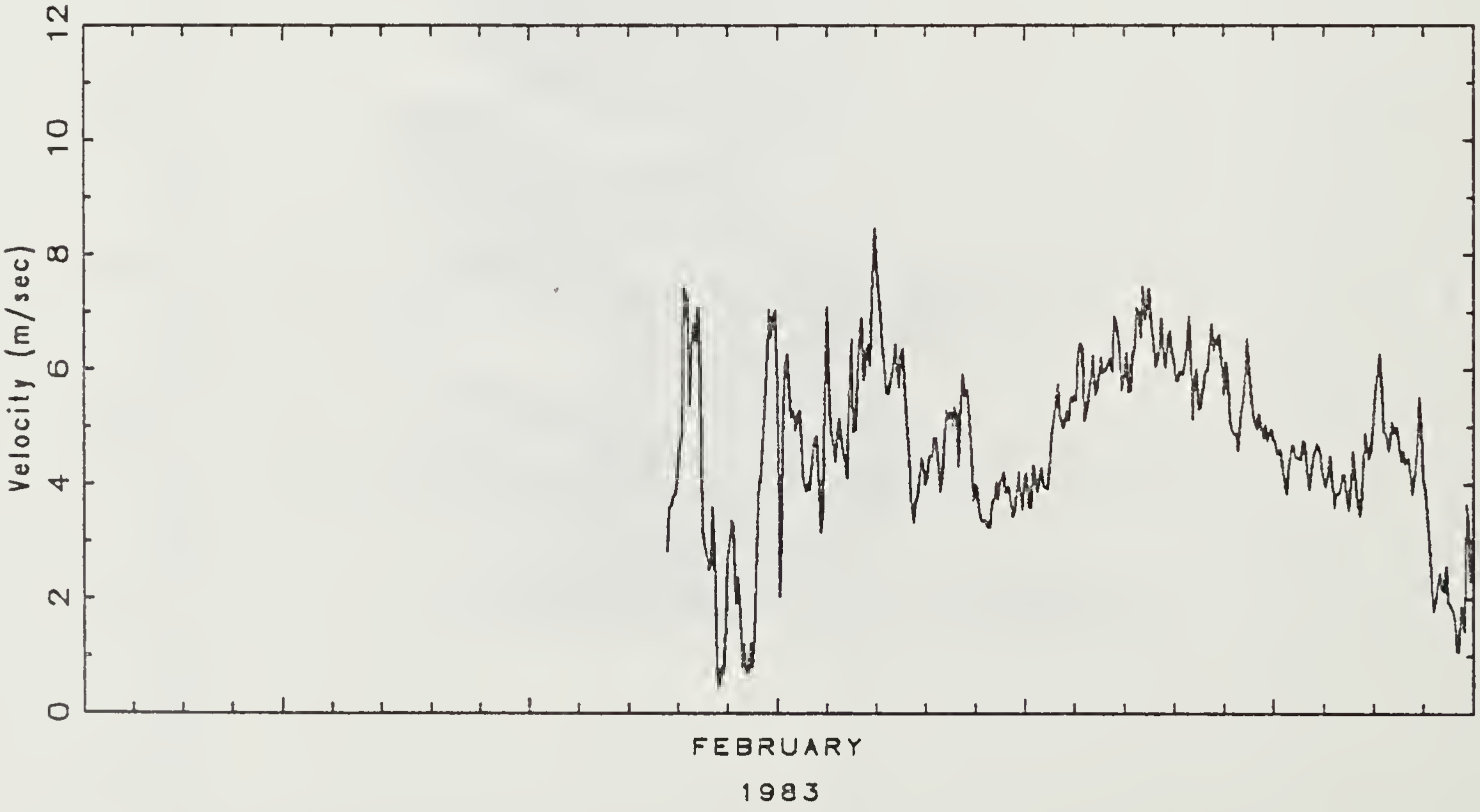

Velocity (m/sec)
0
3
6
9
12
J
F
M
A
M
J
J
A
S
O
N
D
1983


North / South Component (m/sec)
12
8
4
0
-4
-8
J
F
M
A
M
J
J
A
S
O
N
D
1983

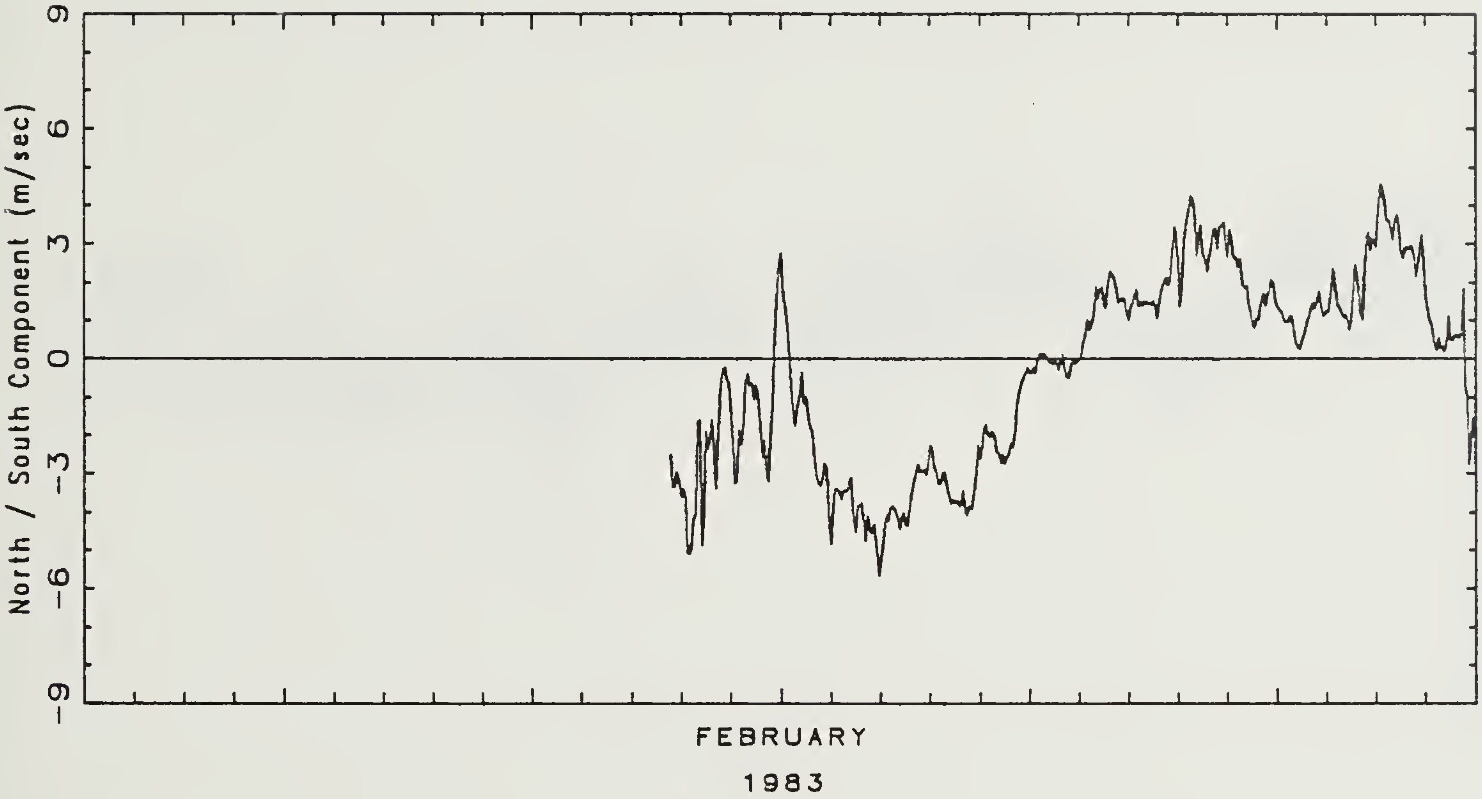

East / West Component (m/sec)
8
4
0
-4
-8
-12
J
F
M
A
M
J
J
A
S
O
N
D
1983

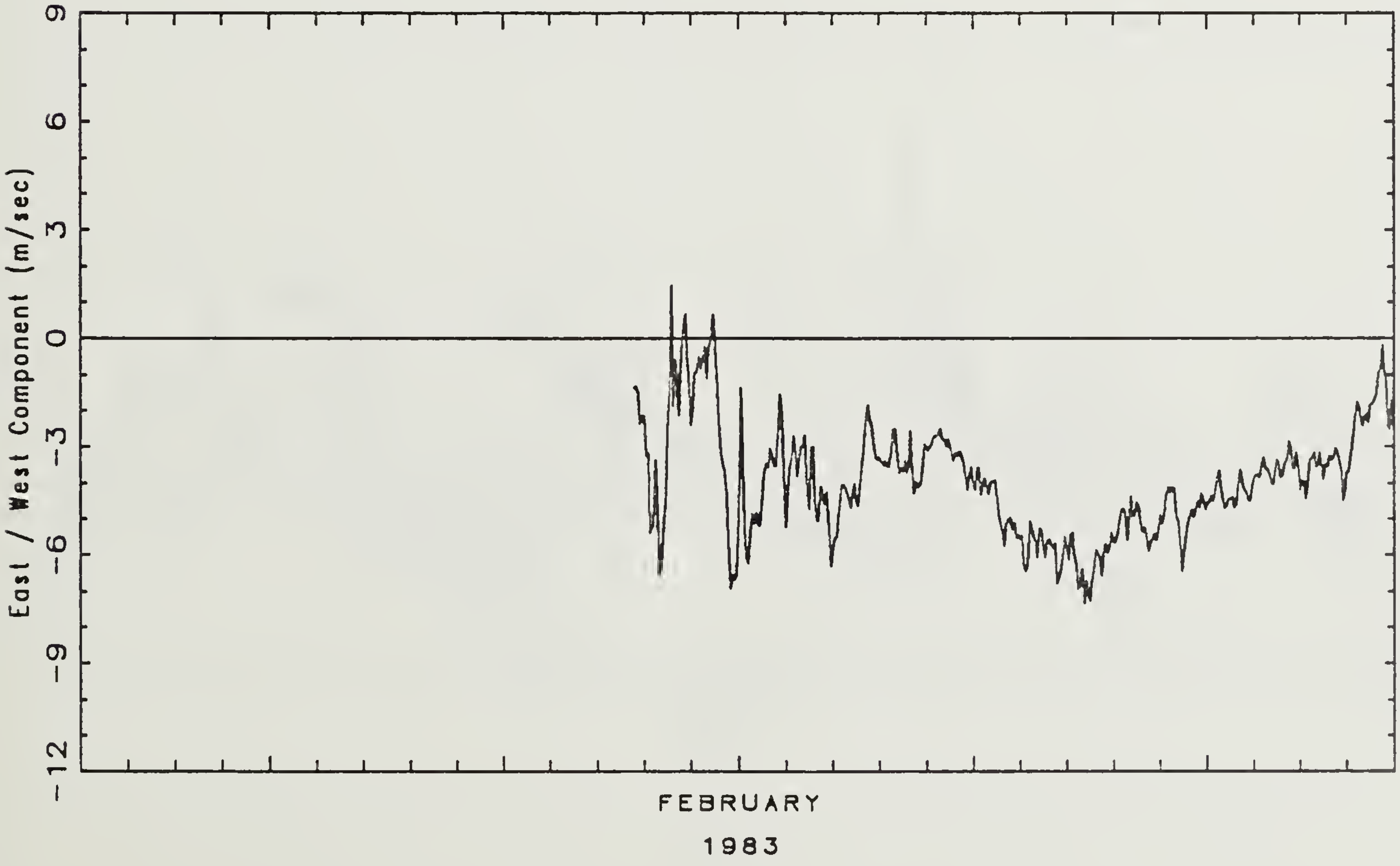
February 1983



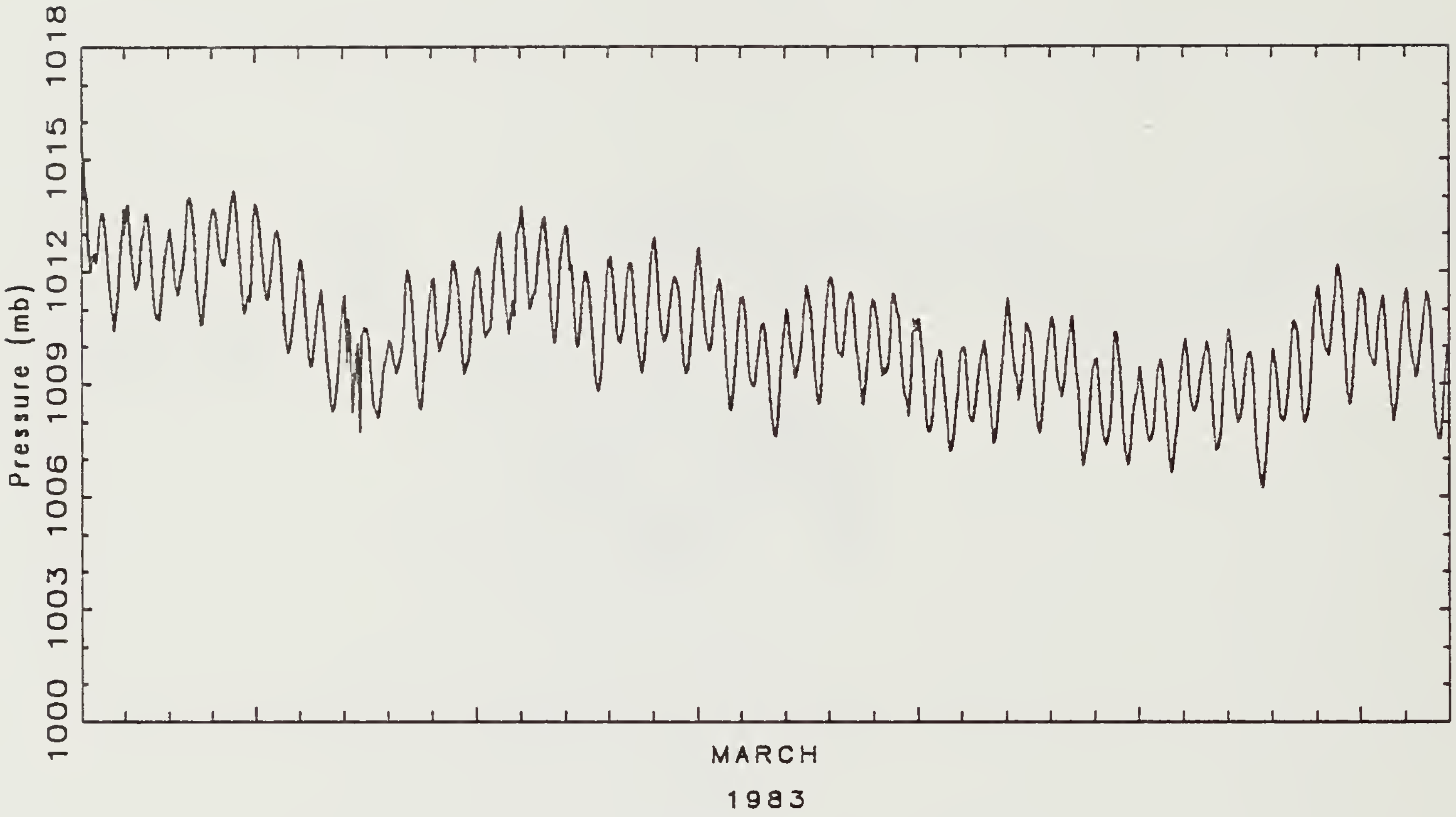


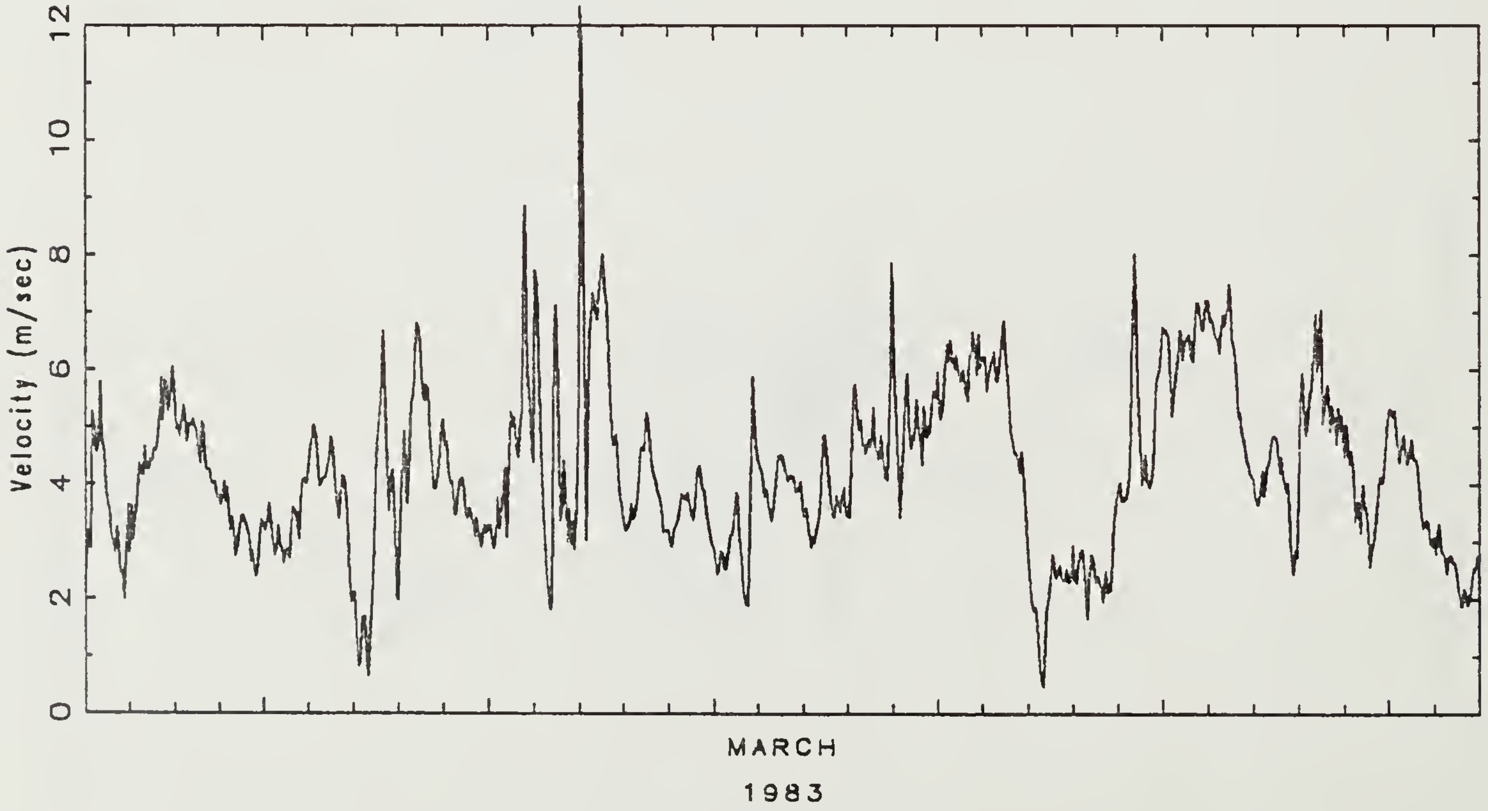
February 1983



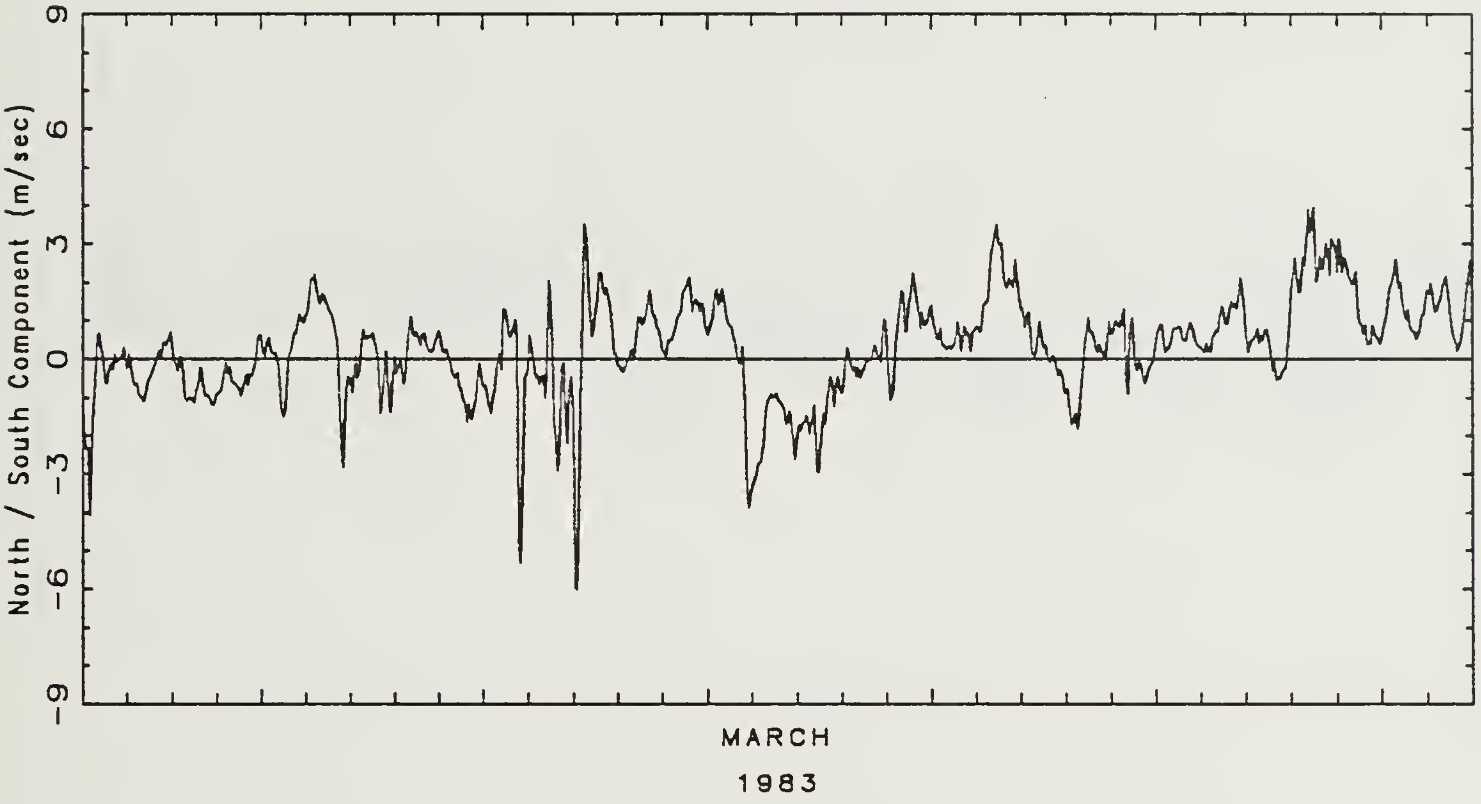


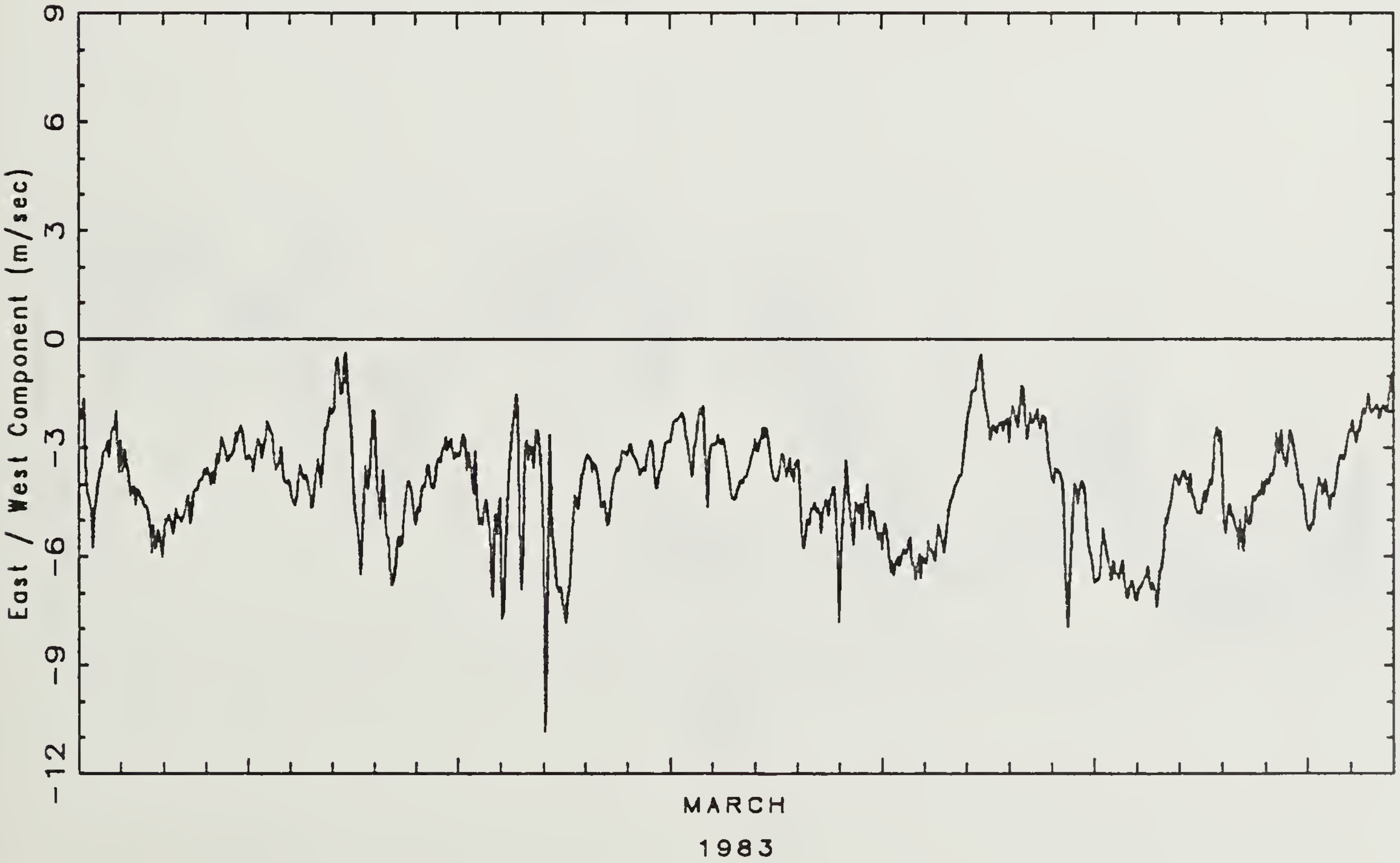
March 1983


Pressure (mb)
1000
1003
1006
1009
1012
1015
1018
MARCH
1983


Velocity (m/sec)
0
2
4
6
8
10
12
MARCH
1983

March 1983


9
6
3
0
-3
-6
-9
North / South Component (m/sec)
MARCH
1983


9
6
3
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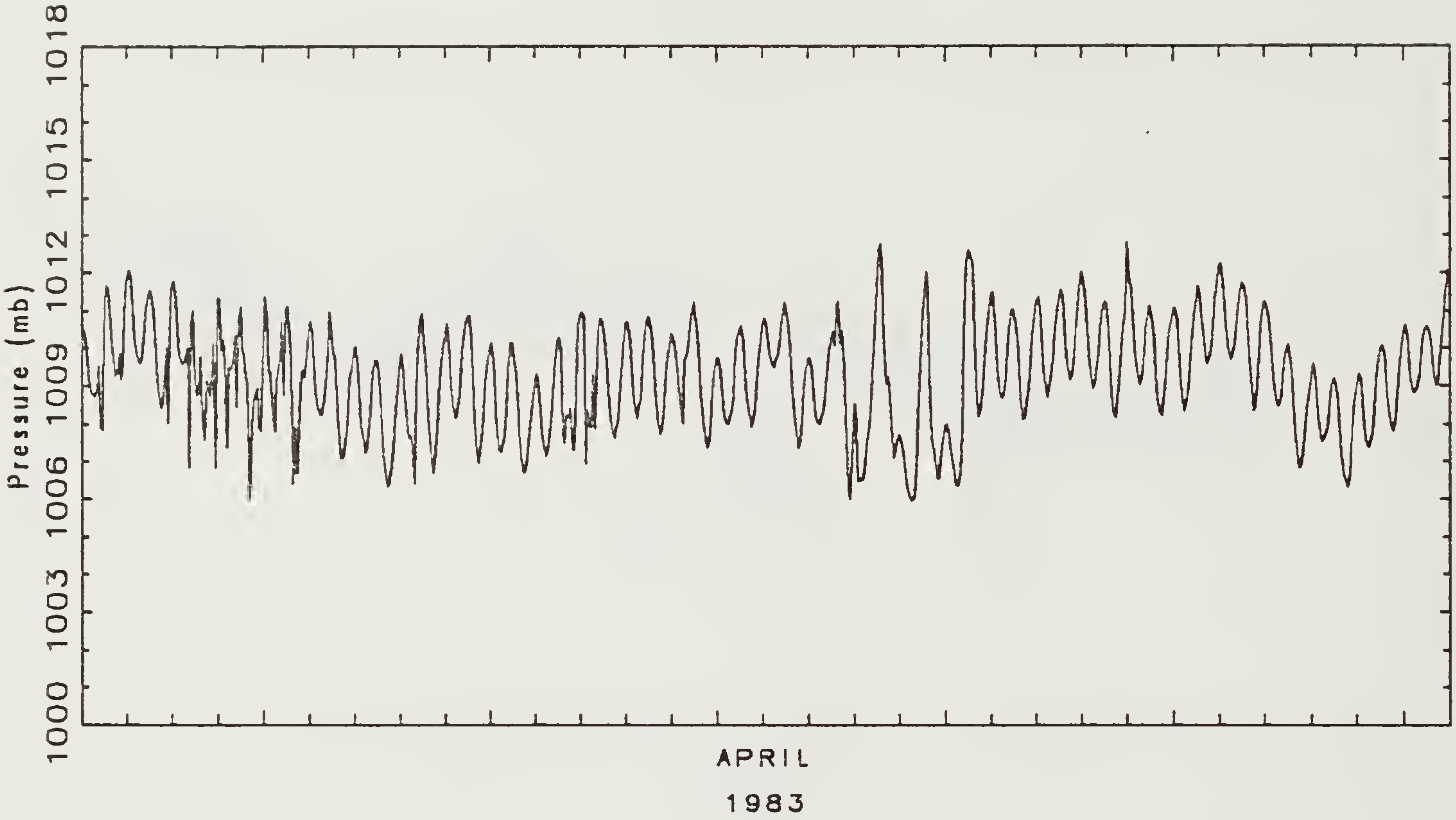
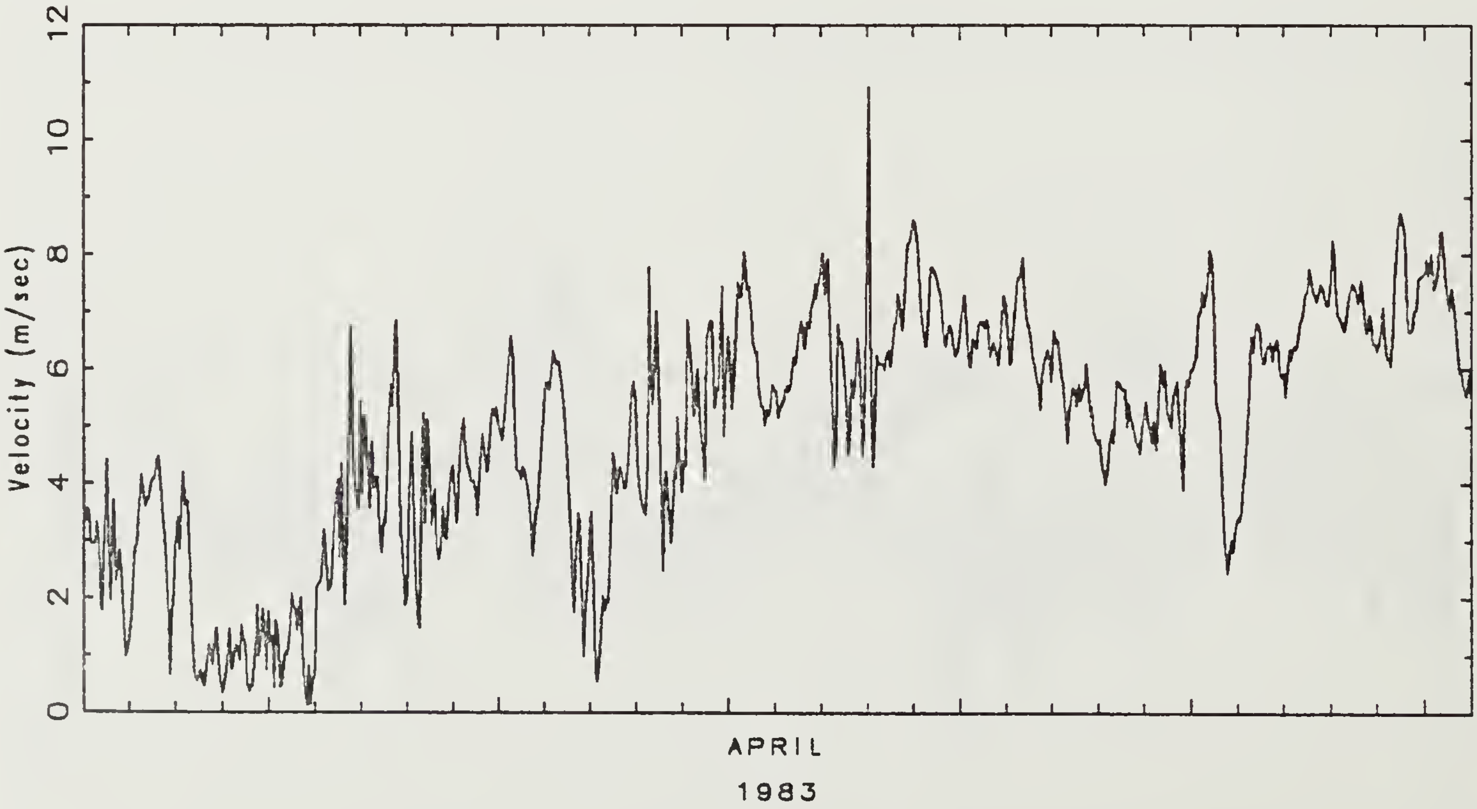
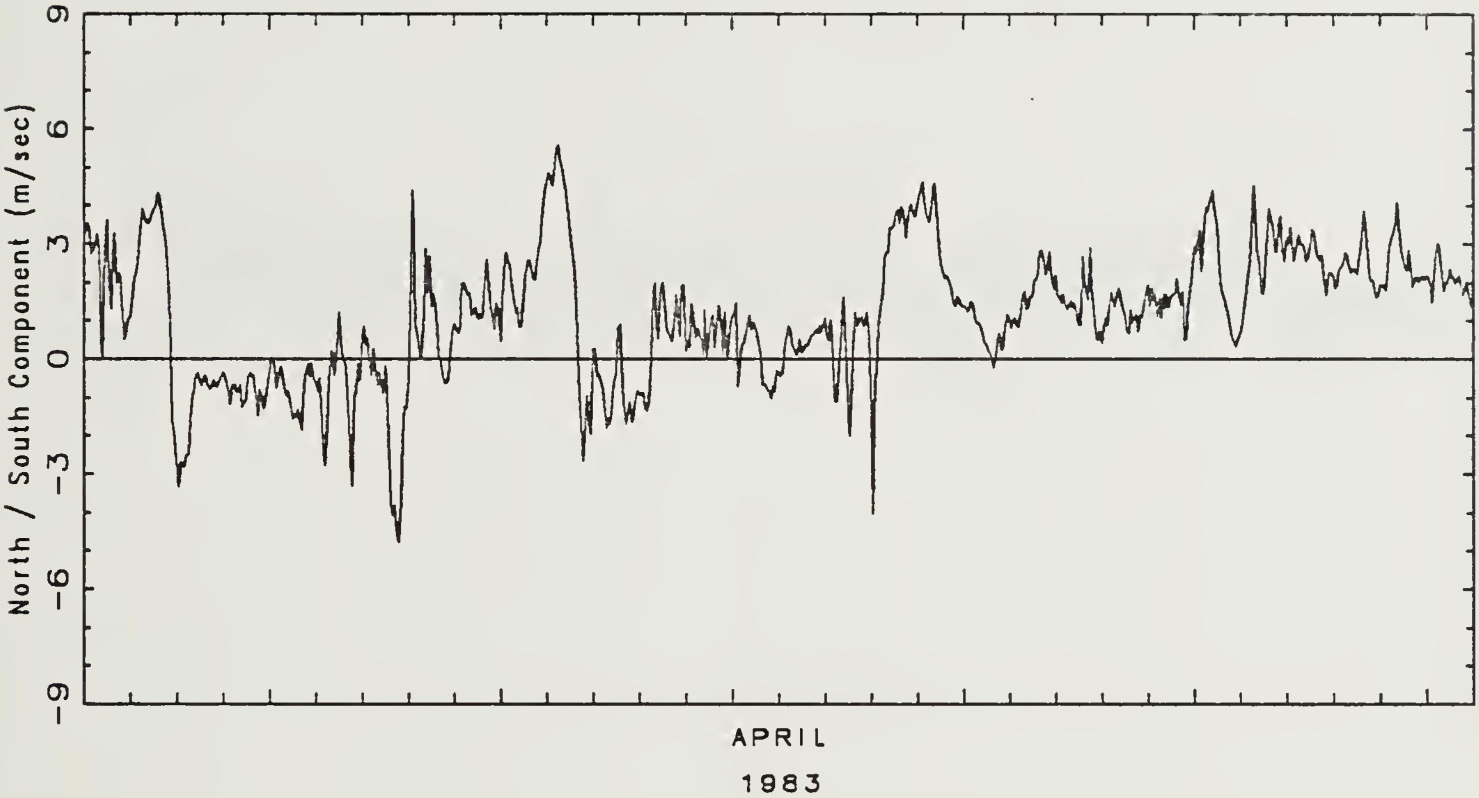
-3
-6
-9
-12
East / West Component (m/sec)
MARCH
1983

April 1983

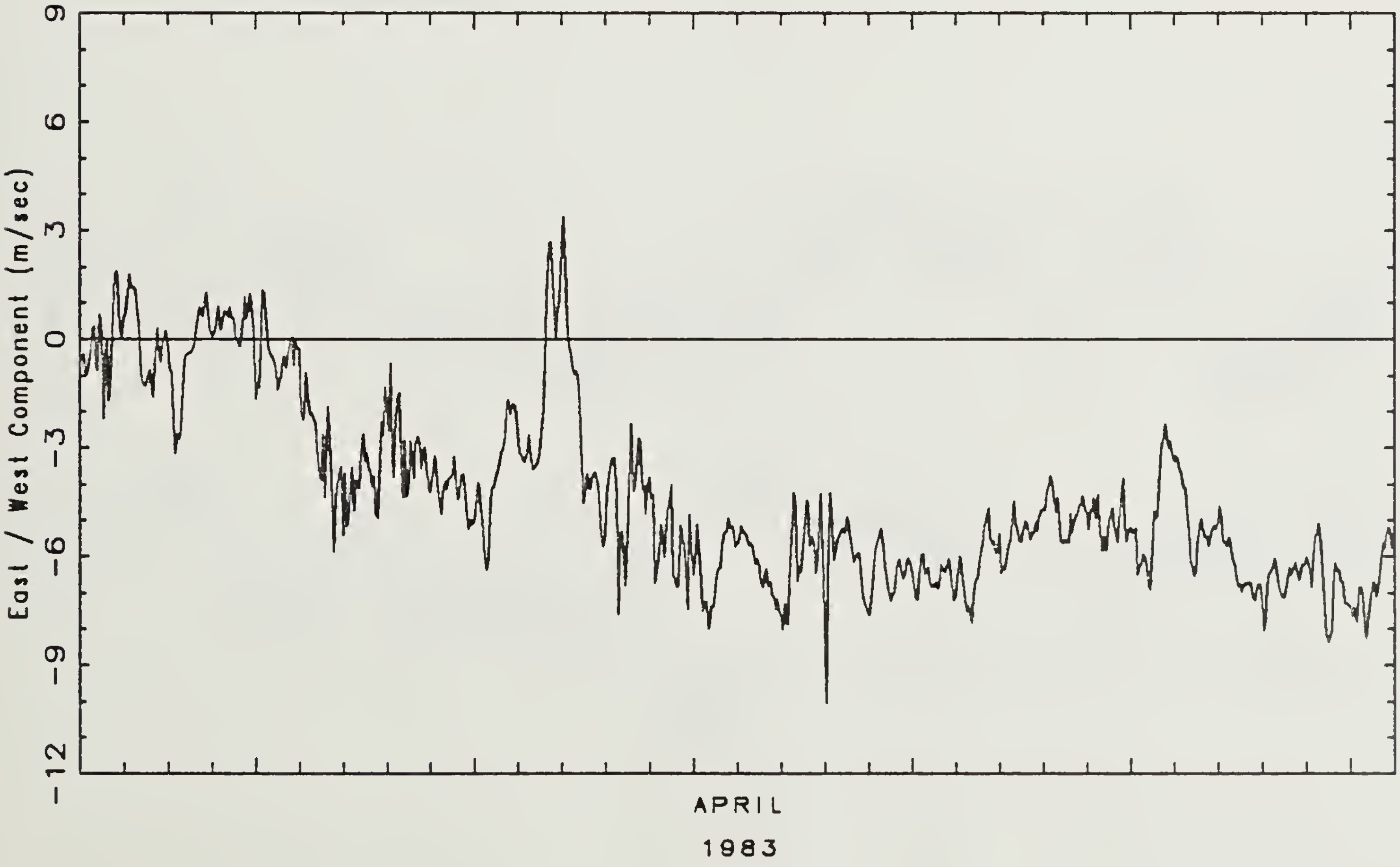

Pressure (mb)
1000
1003
1006
1009
1012
1015
1018
APRIL
1983


Velocity (m/sec)
0
2
4
6
8
10
12
APRIL
1983

April 1983

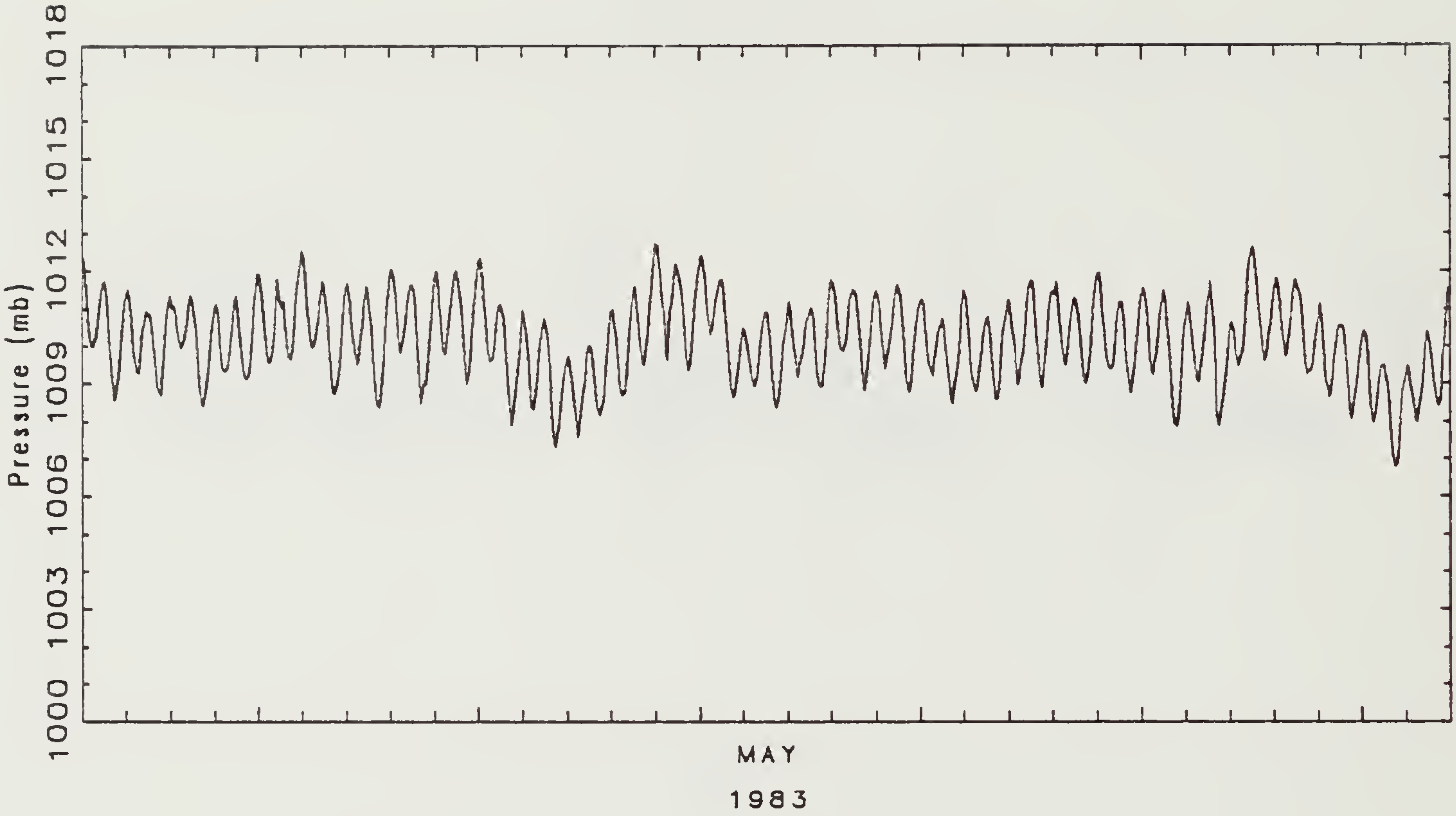


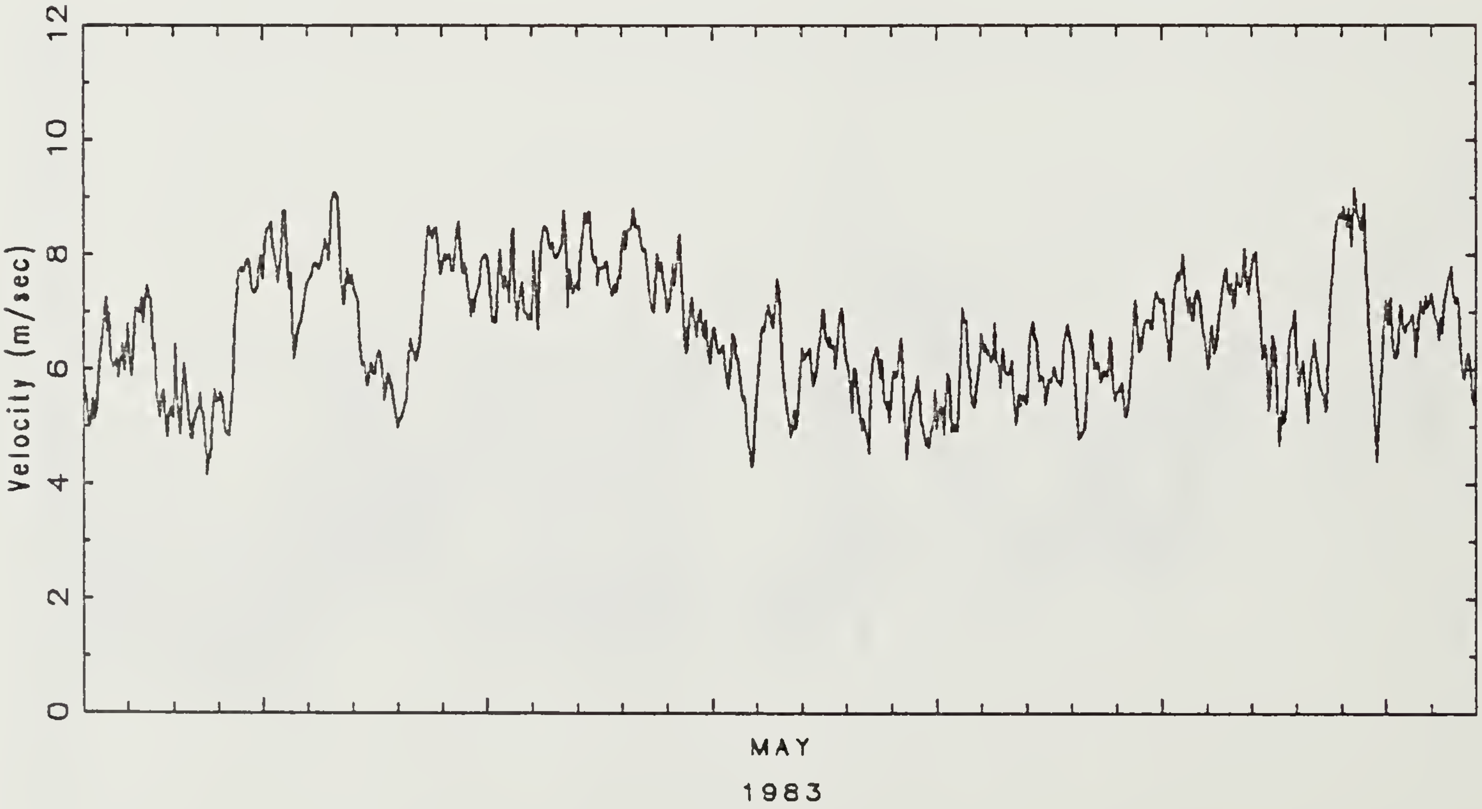
9
6
3
0
-3
-6
-9
North / South Component (m/sec)
APRIL
1983



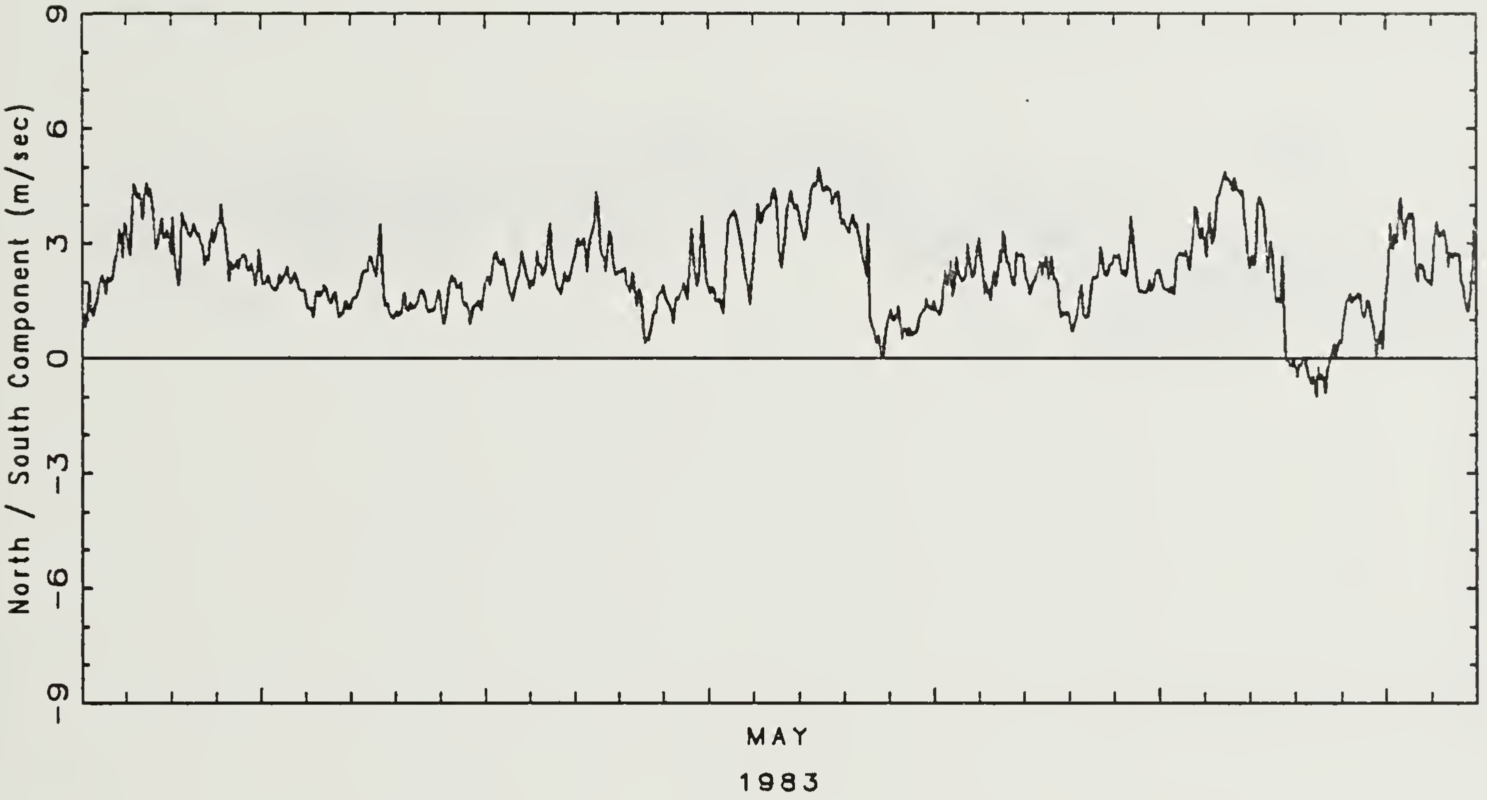
9
6
3
0
-3
-6
-9
-12
East / West Component (m/sec)
APRIL
1983

May 1983


Pressure (mb)
1000
1003
1006
1009
1012
1015
1018
MAY
1983


Velocity (m/sec)
0
2
4
6
8
10
12
MAY
1983

May 1983


9
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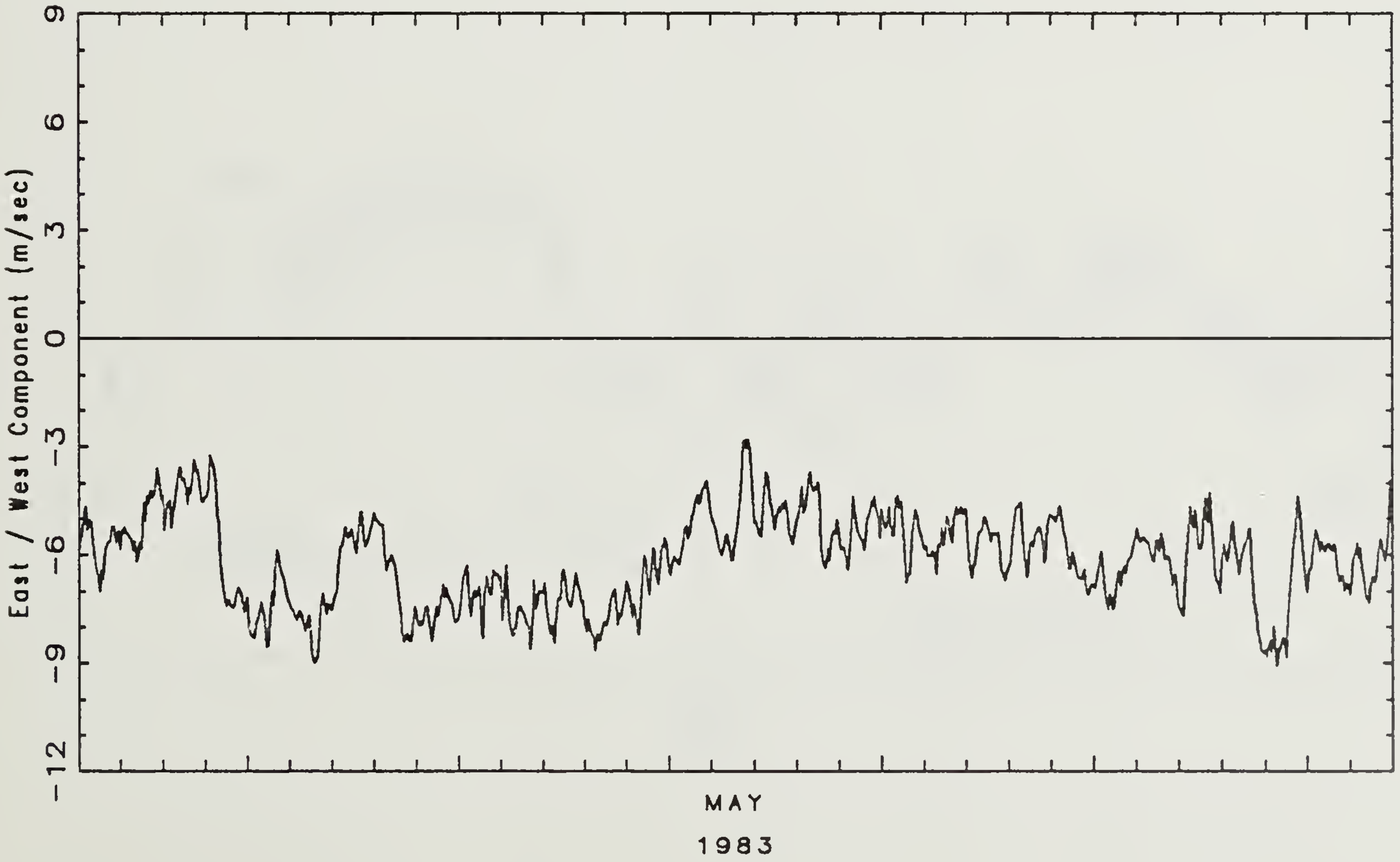
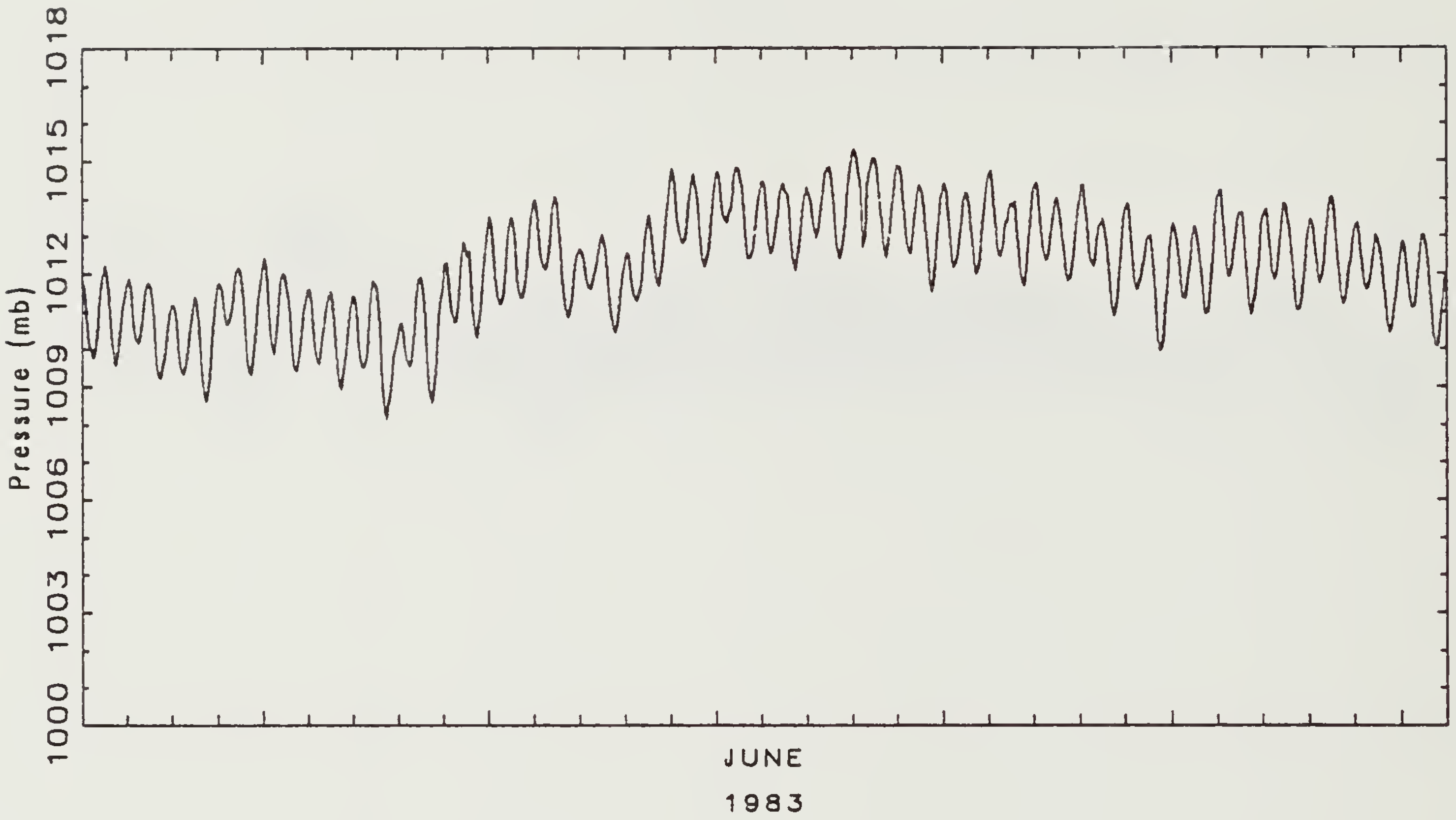
-3
-6
-9
North / South Component (m/sec)
MAY
1983


9
6
3
0
-3
-6
-9
-12
East / West Component (m/sec)
MAY
1983

June 1983


Pressure (mb)
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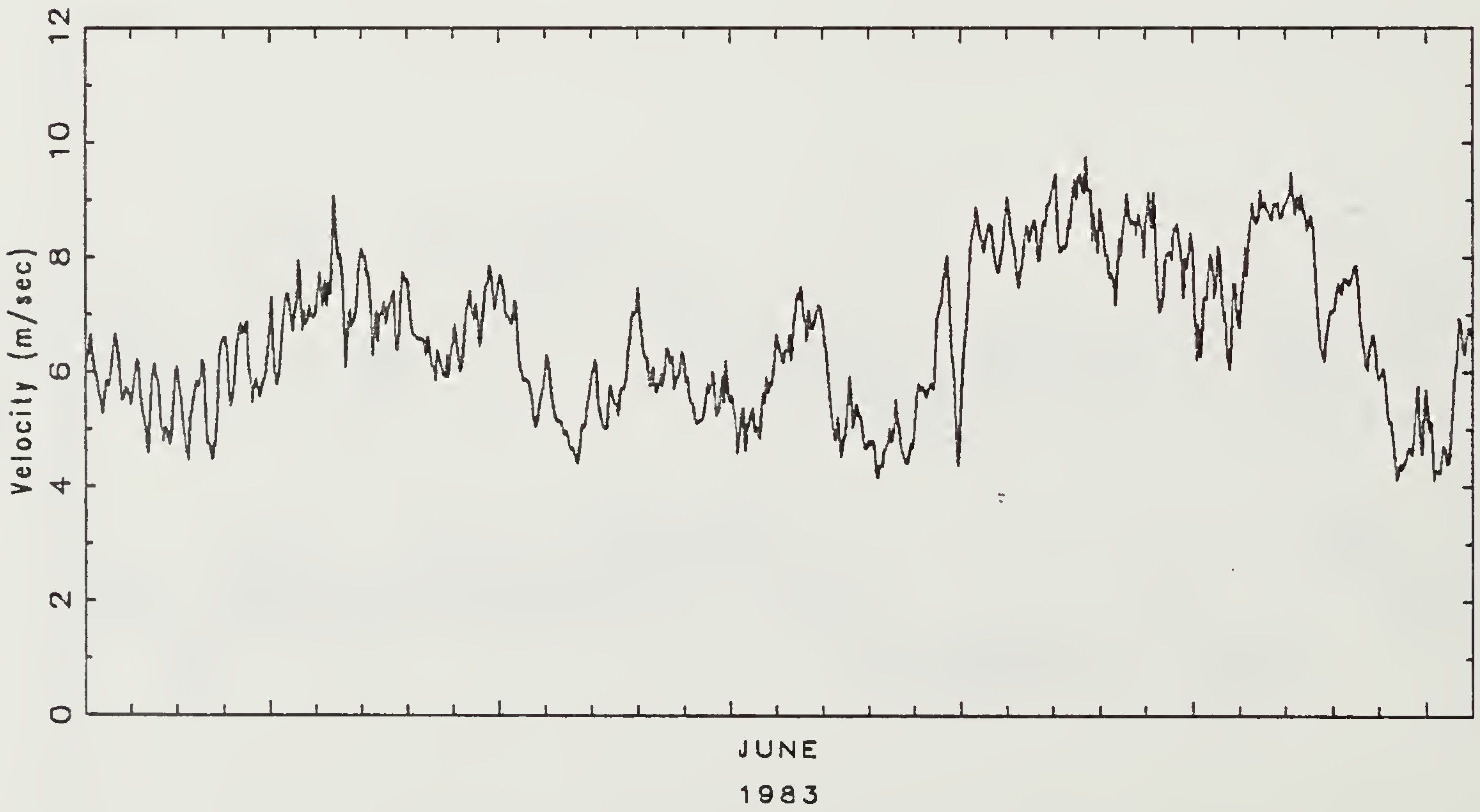
1006
1009
1012
1015
1018
JUNE
1983


Velocity (m/sec)
0
2
4
6
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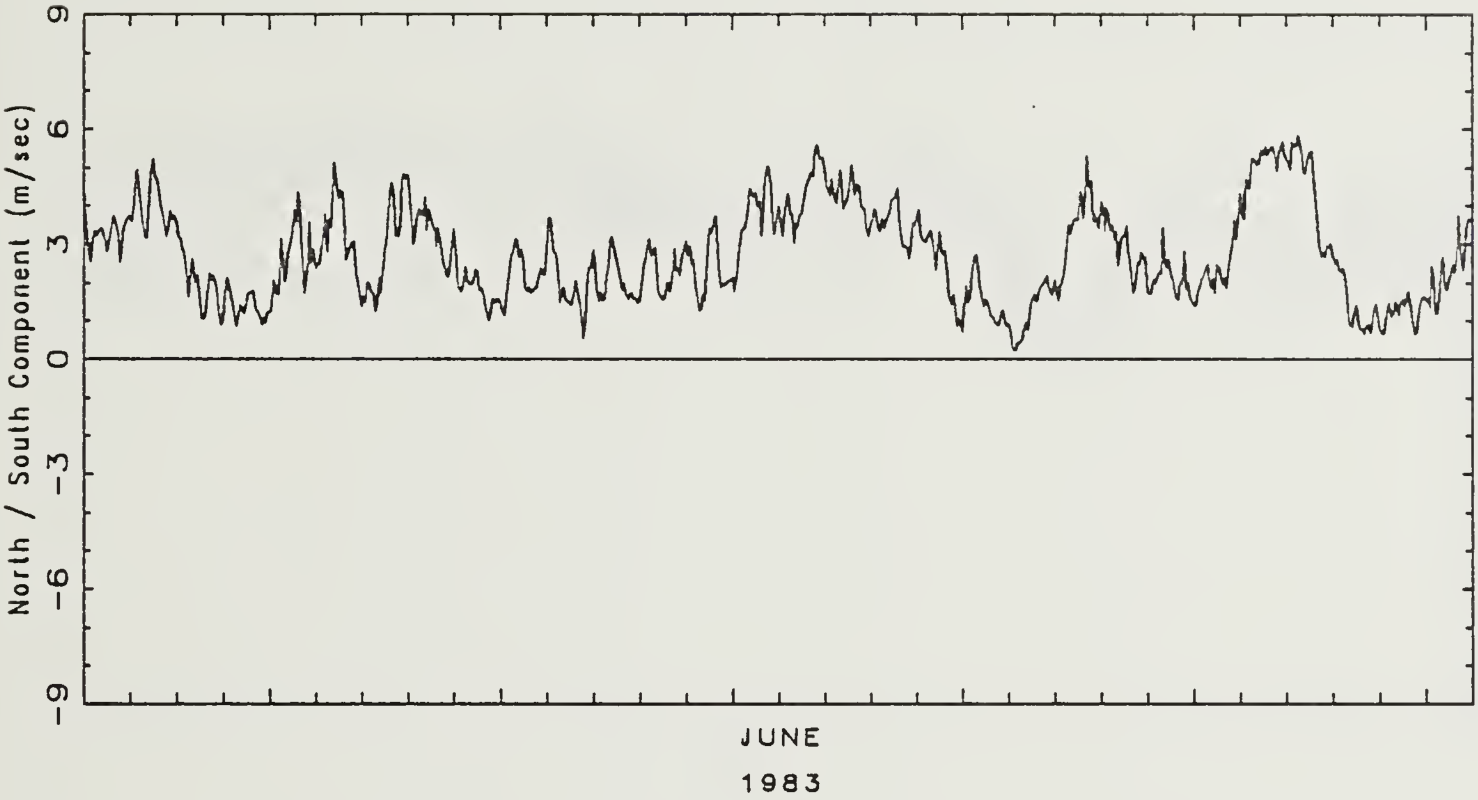
10
12
JUNE
1983

June 1983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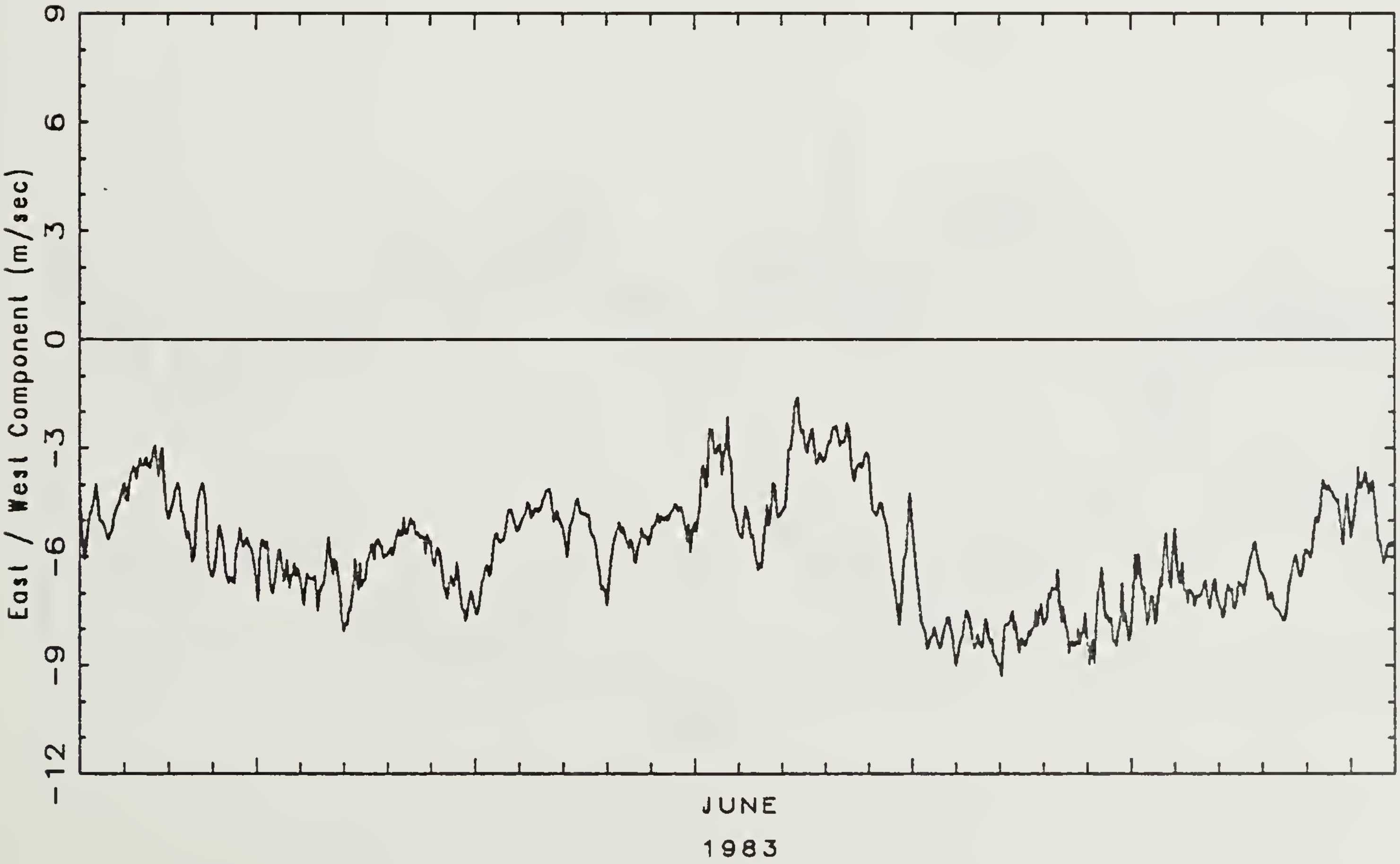
-9
North / South Component (m/sec)
JUNE
1983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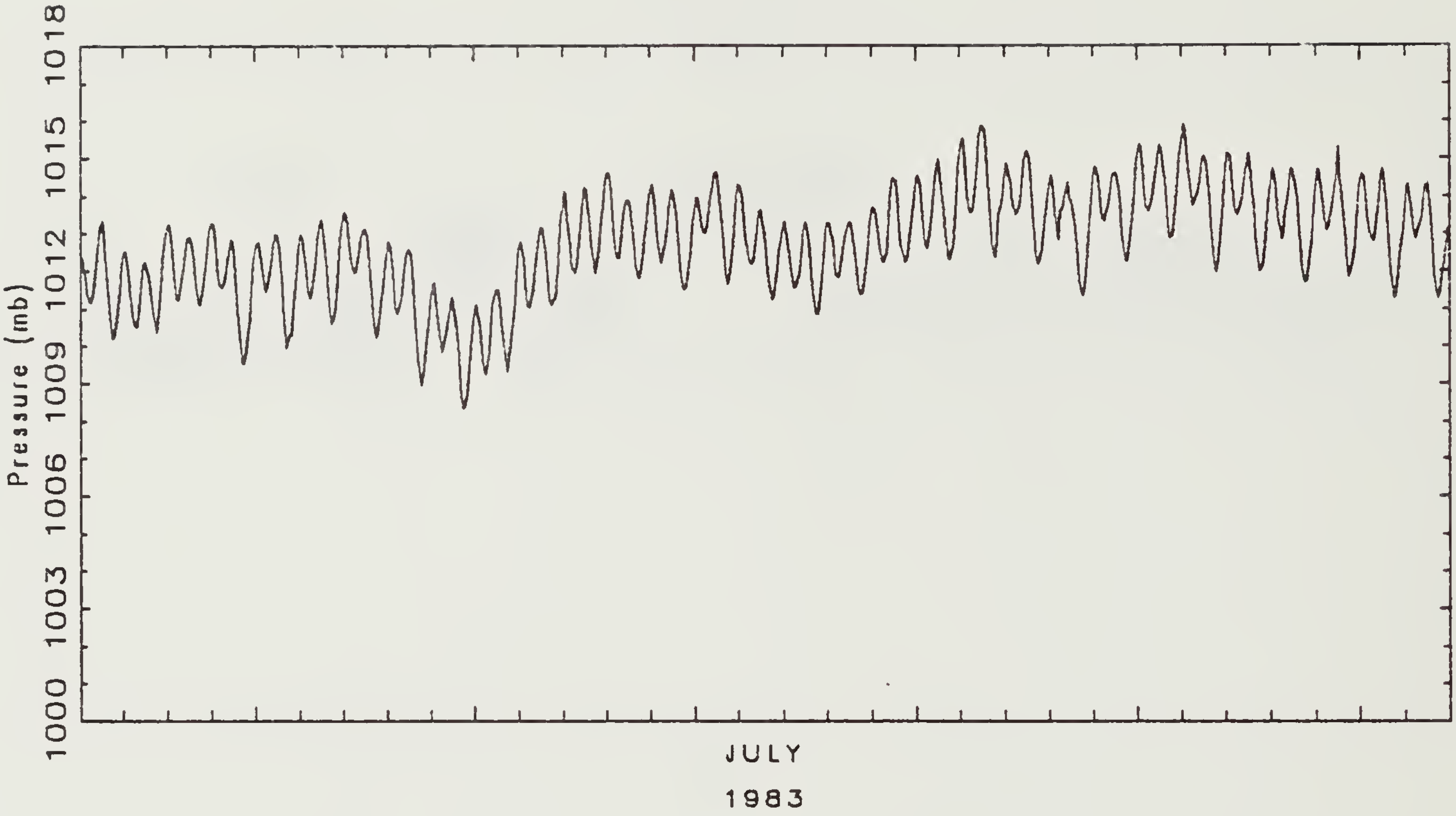
-6
-9
-12
East / West Component (m/sec)
JUNE
1983

July 1983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1012
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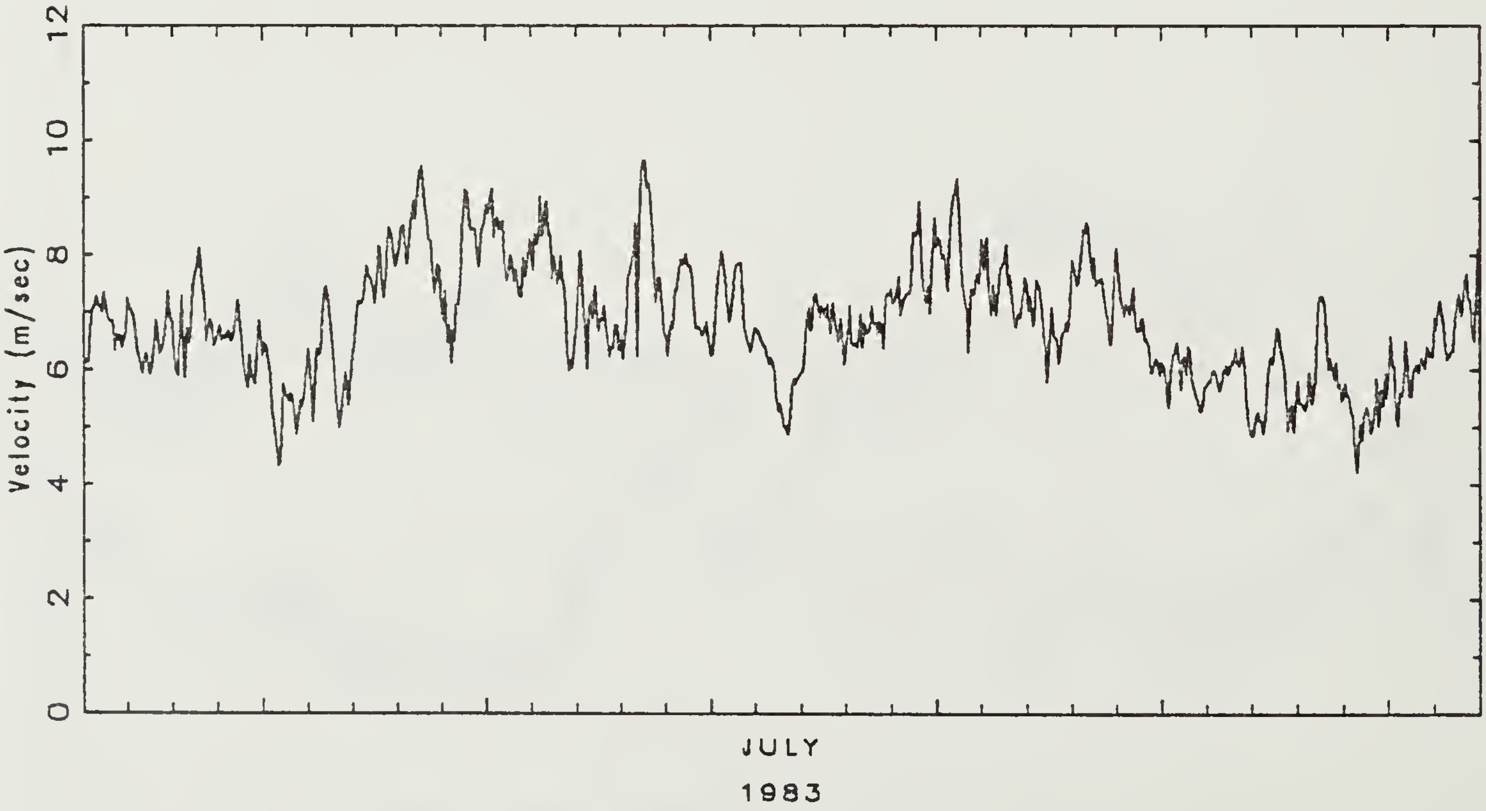
1018
JULY
1983


Velocity (m/sec)
0
2
4
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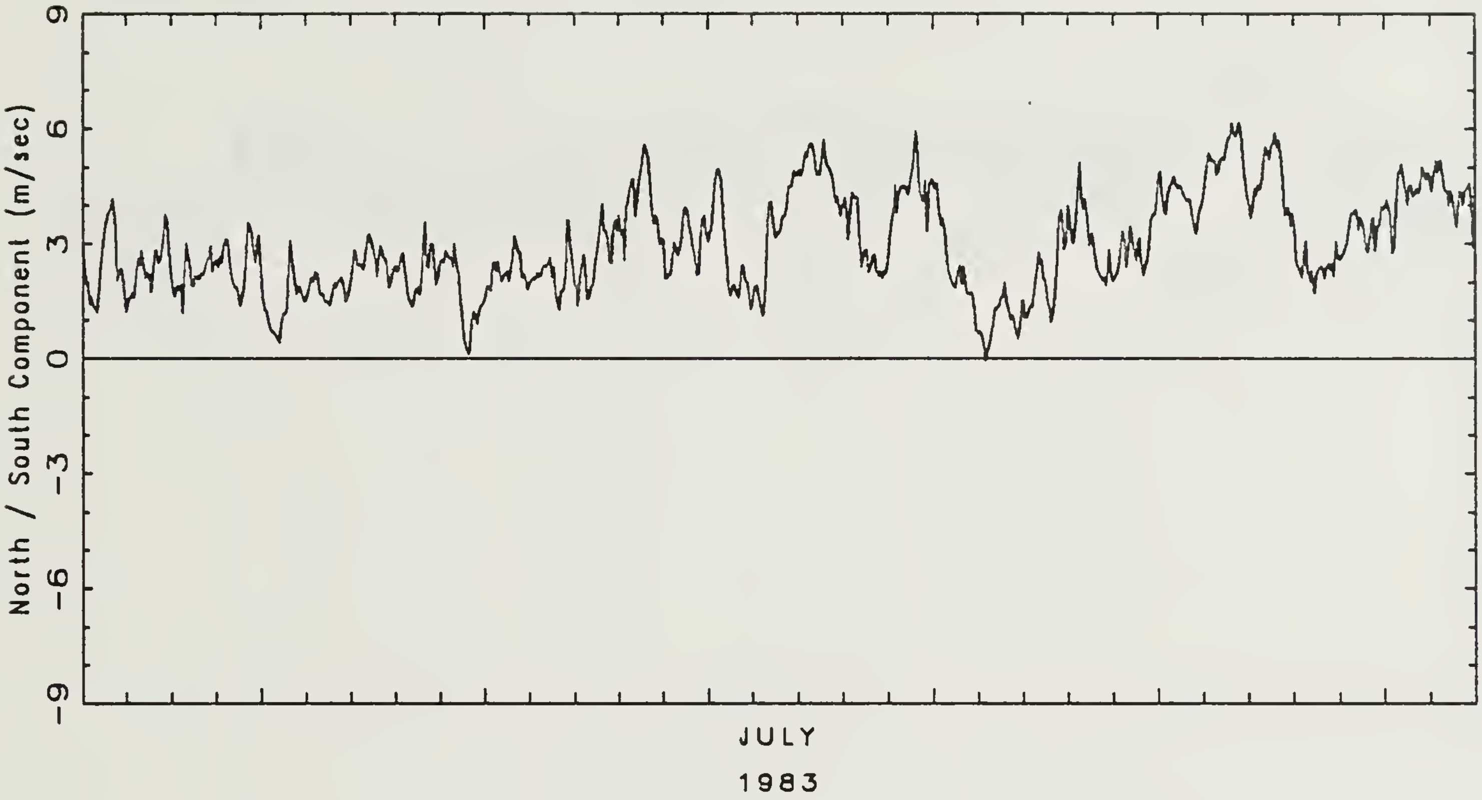
12
JULY
1983

July 1983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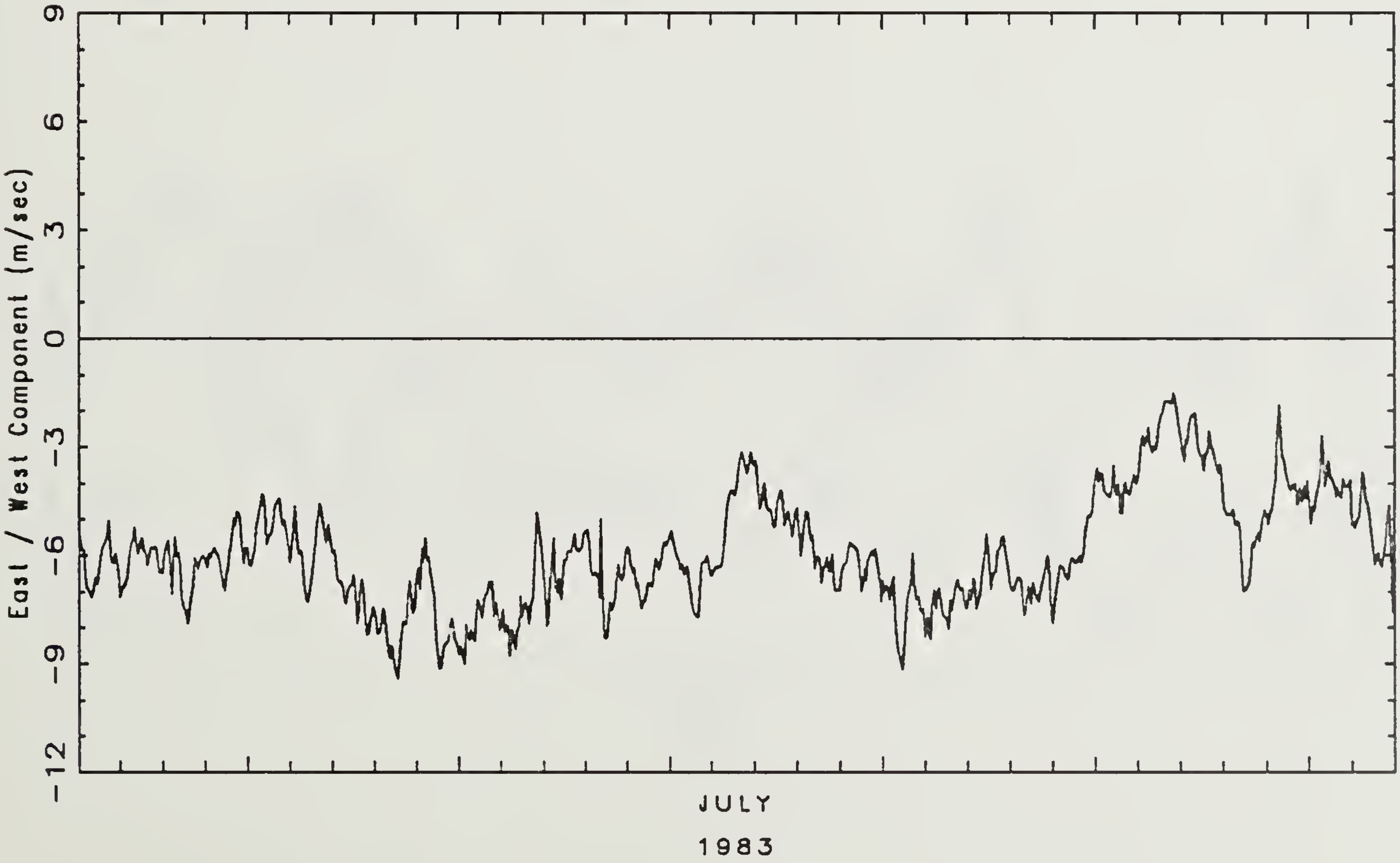
-9
JULY
1983


East / West Component (m/sec)
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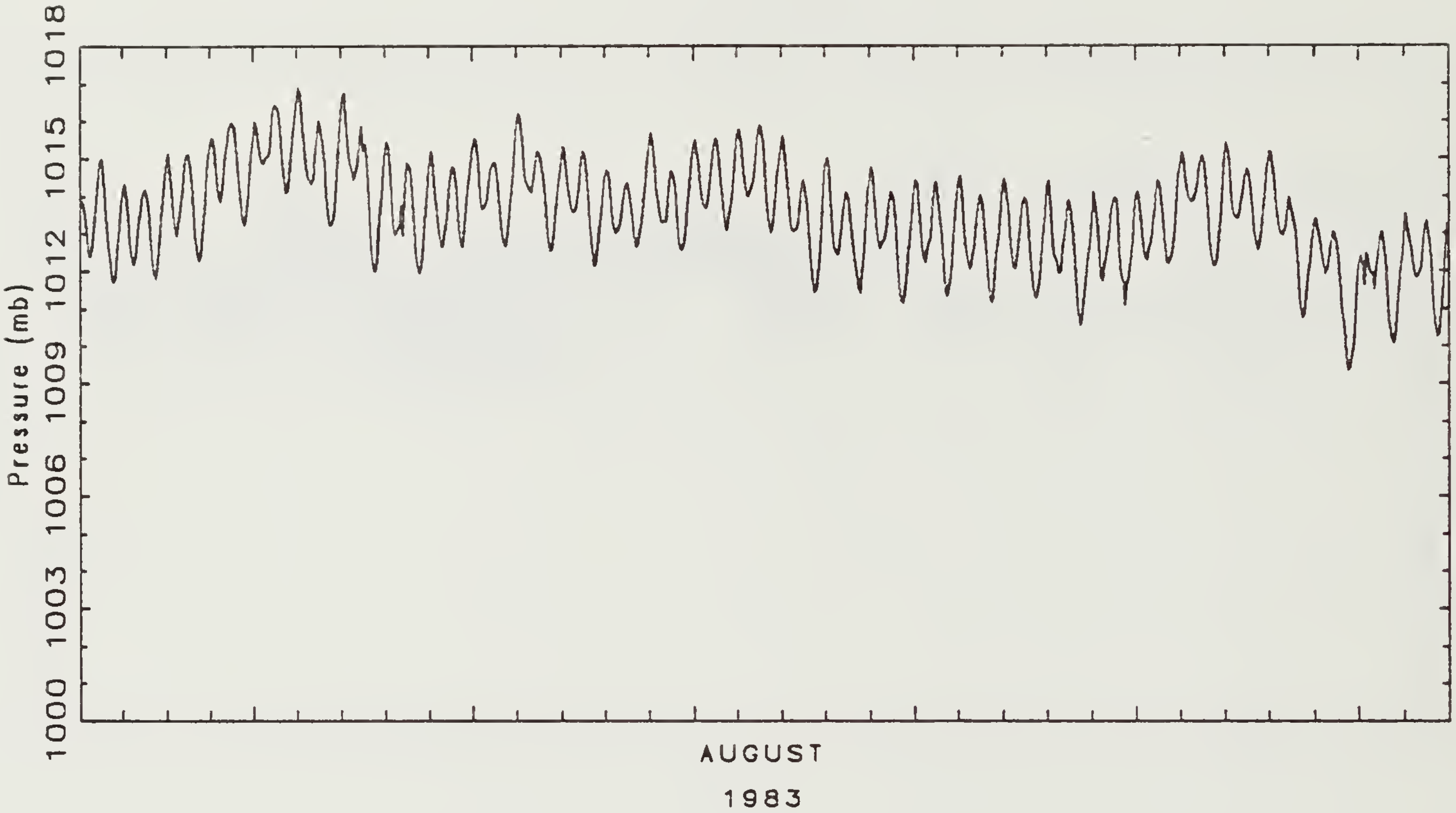
-9
-12
JULY
1983

August 1983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1015
1012
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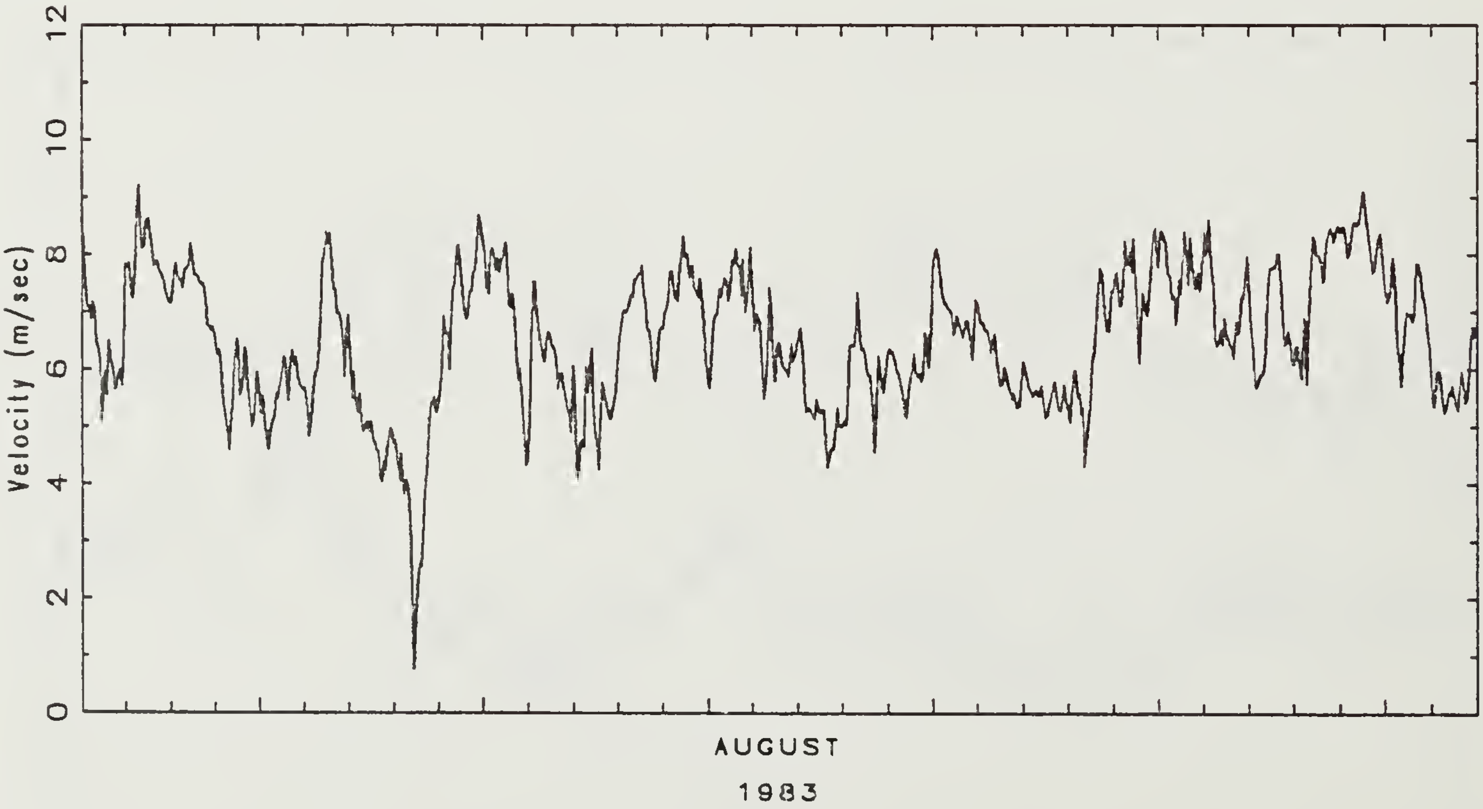
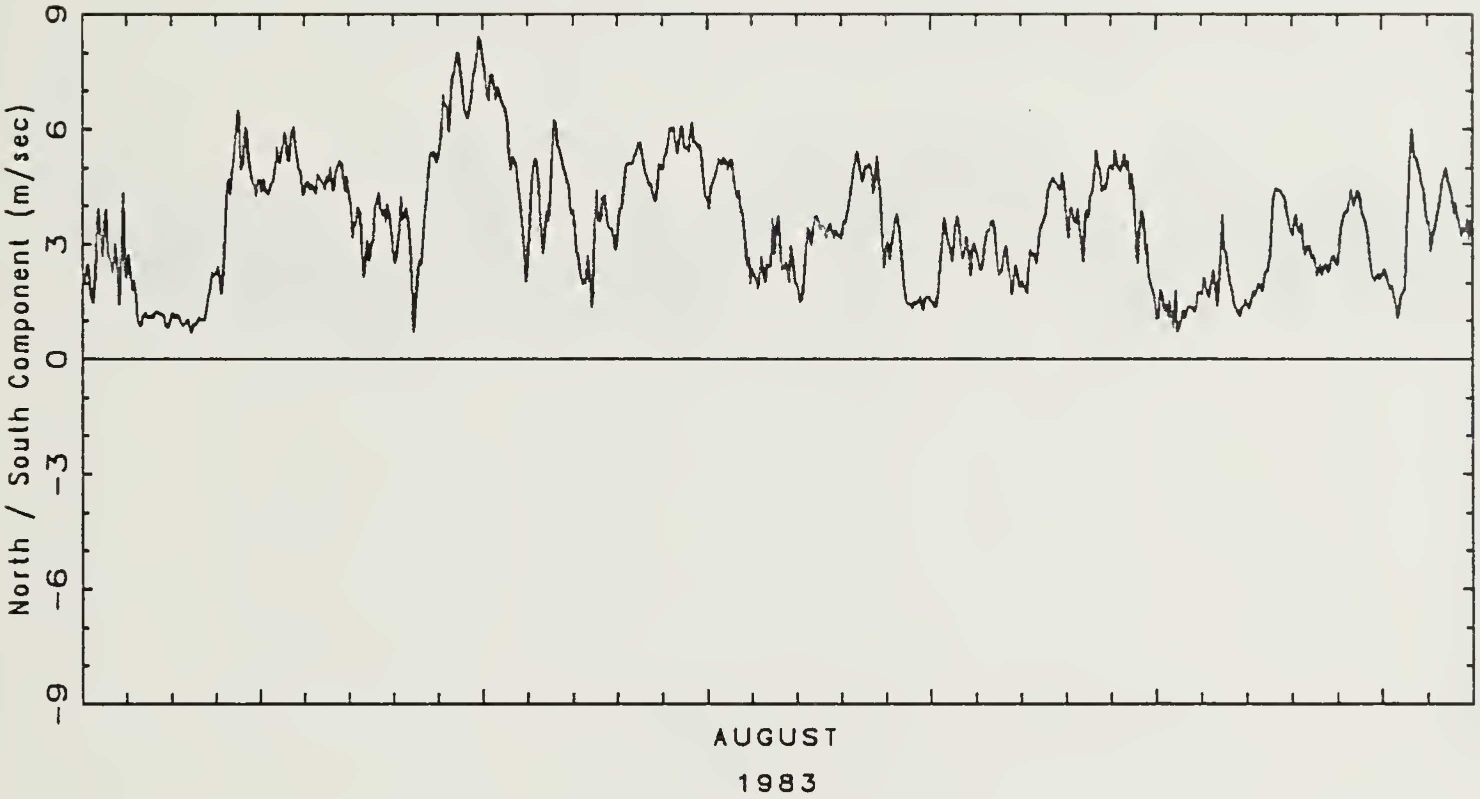
1006
1003
1000
AUGUST
1983


Velocity (m/sec)
12
10
8
6
4
2
0
AUGUST
1983

August 1983


North / South Component (m/sec)
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3
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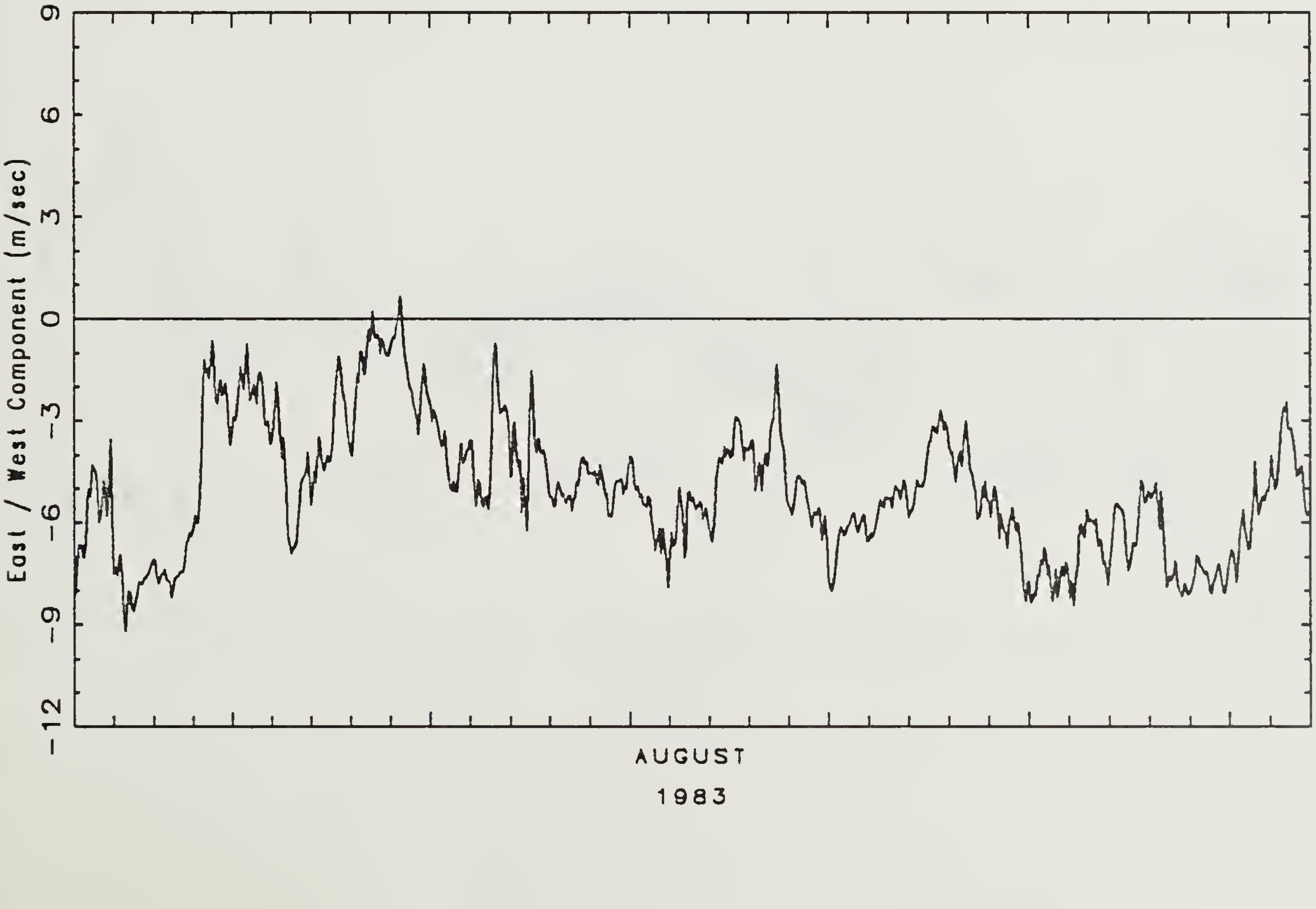
-3
-6
-9
AUGUST
1983


East / West Component (m/sec)
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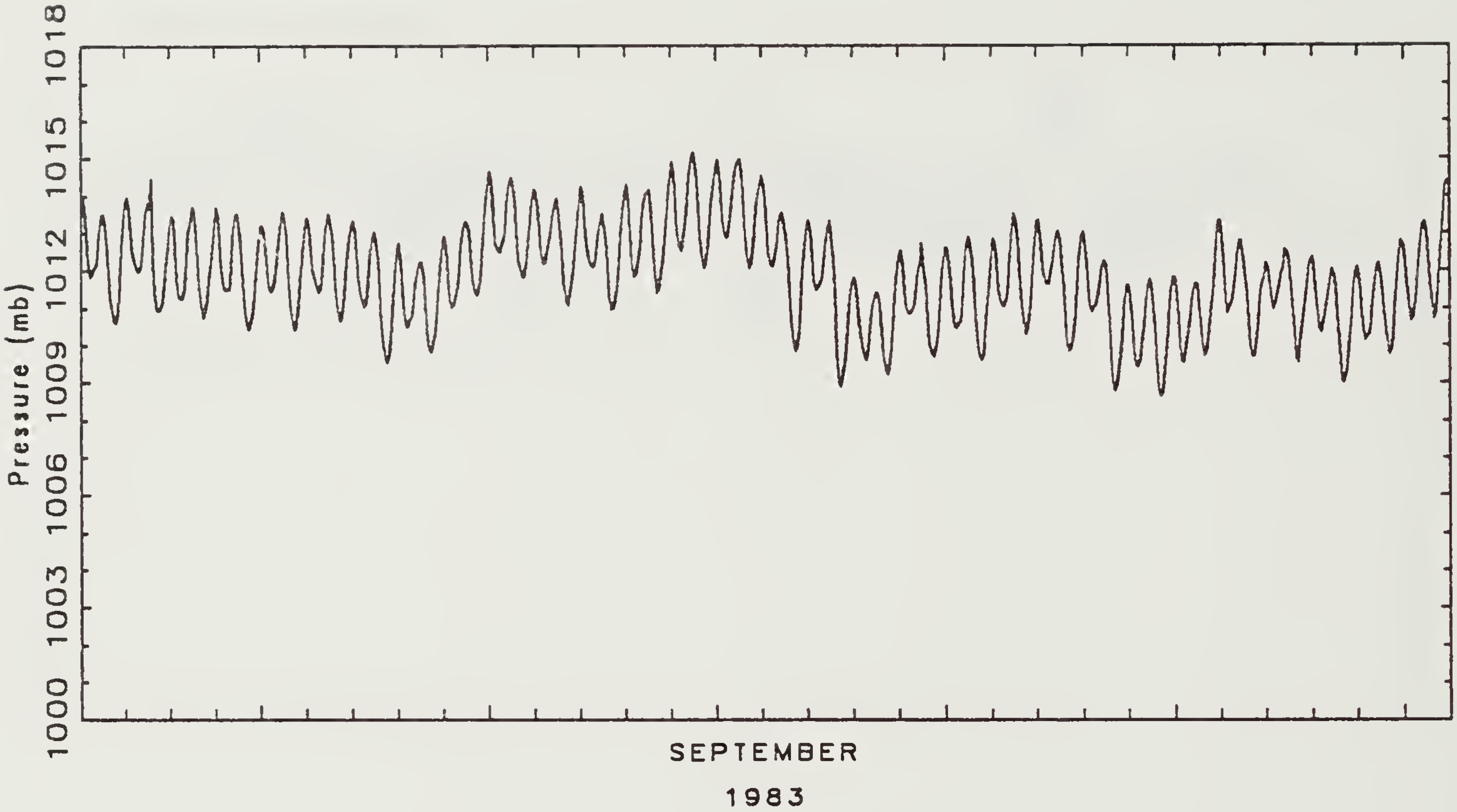
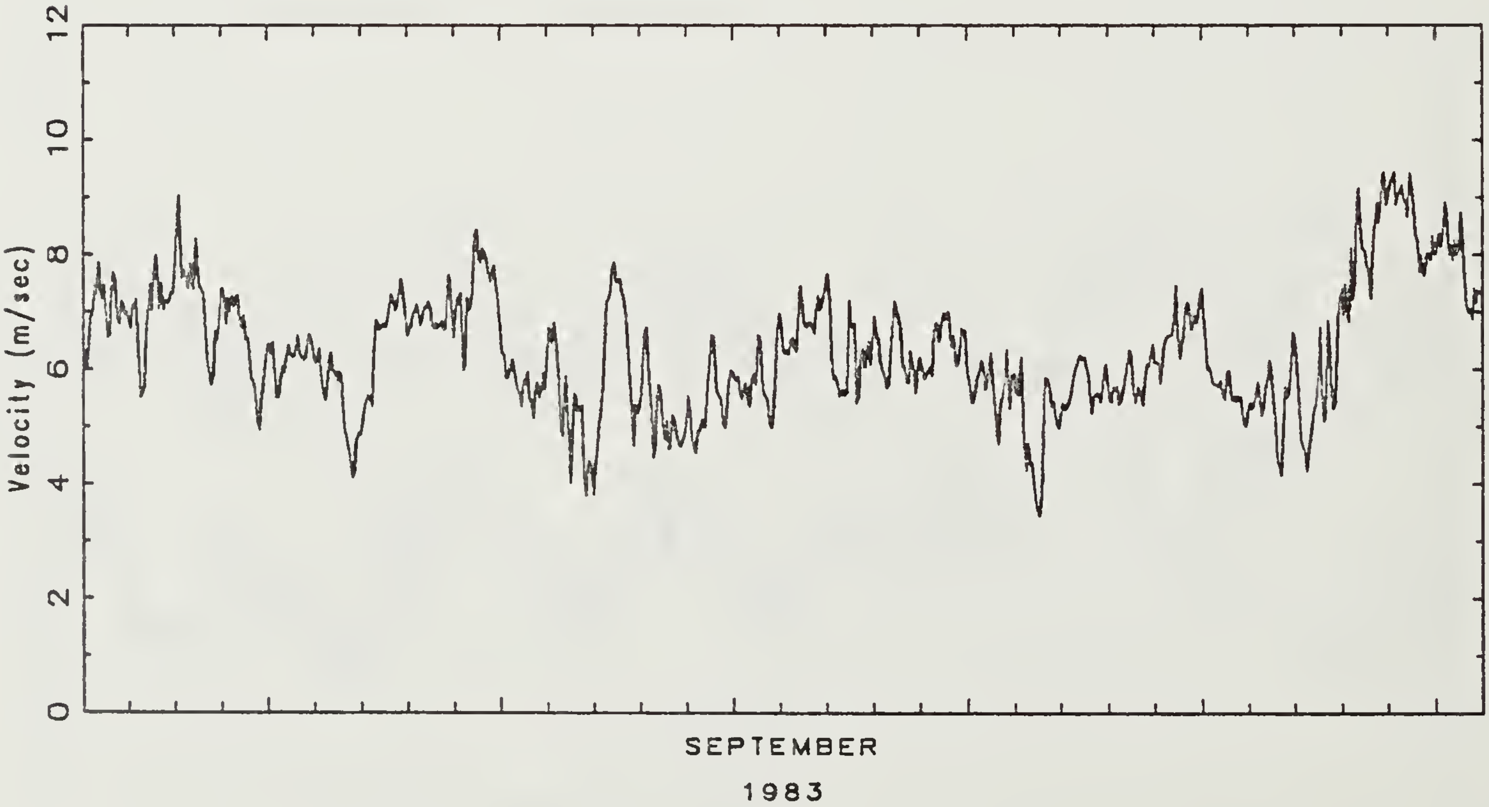
0
-3
-6
-9
-12
AUGUST
1983

September 1983





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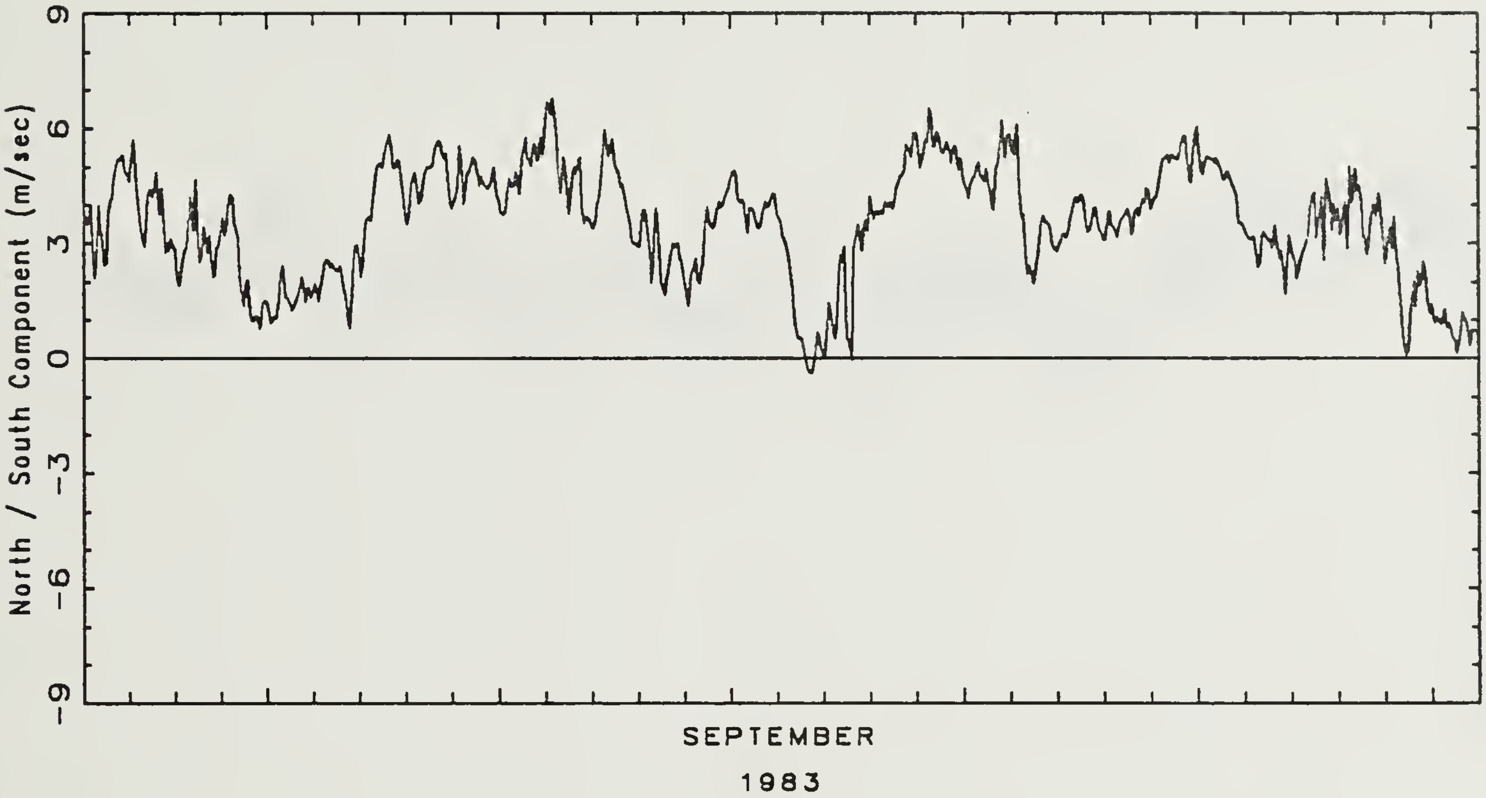

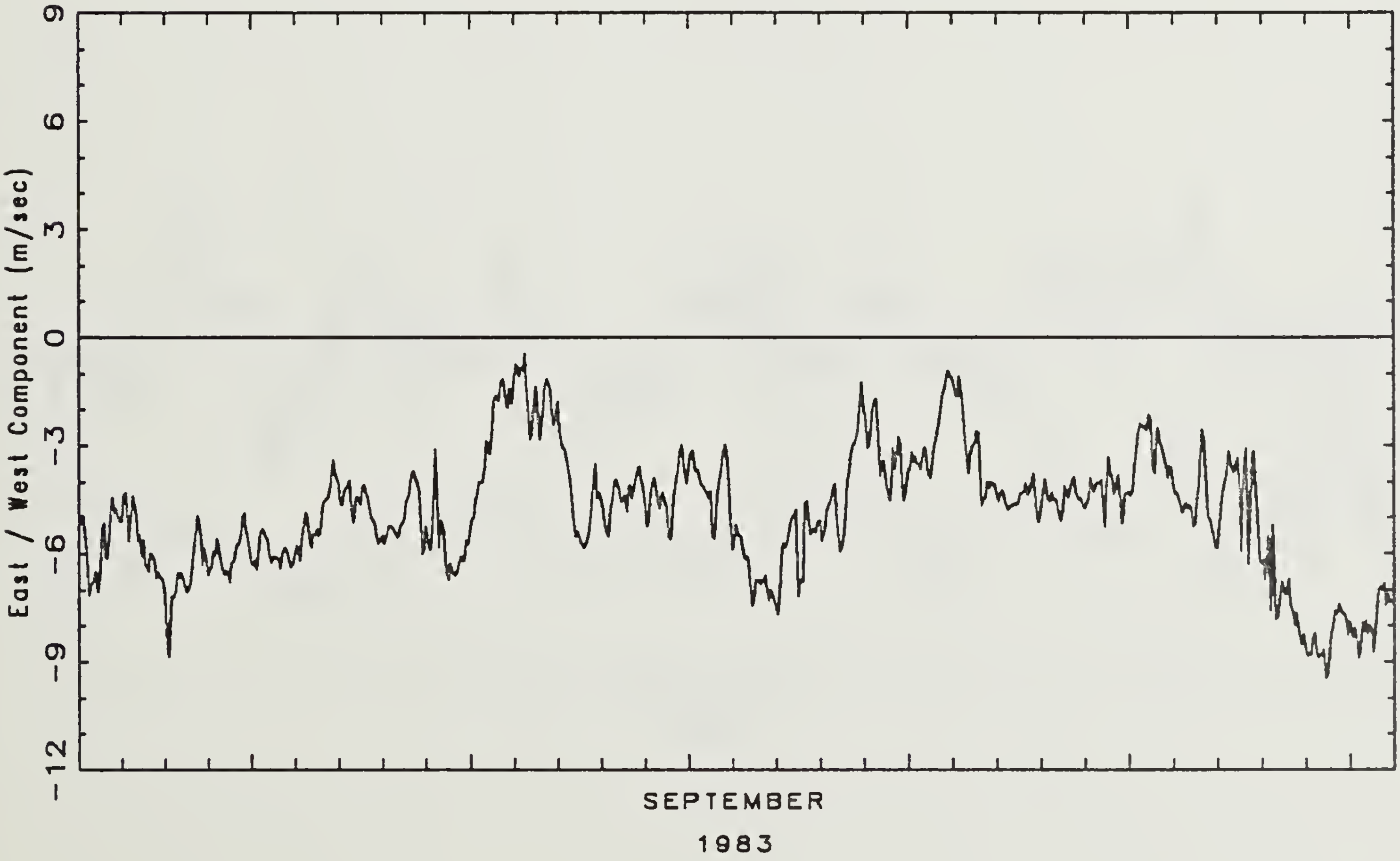

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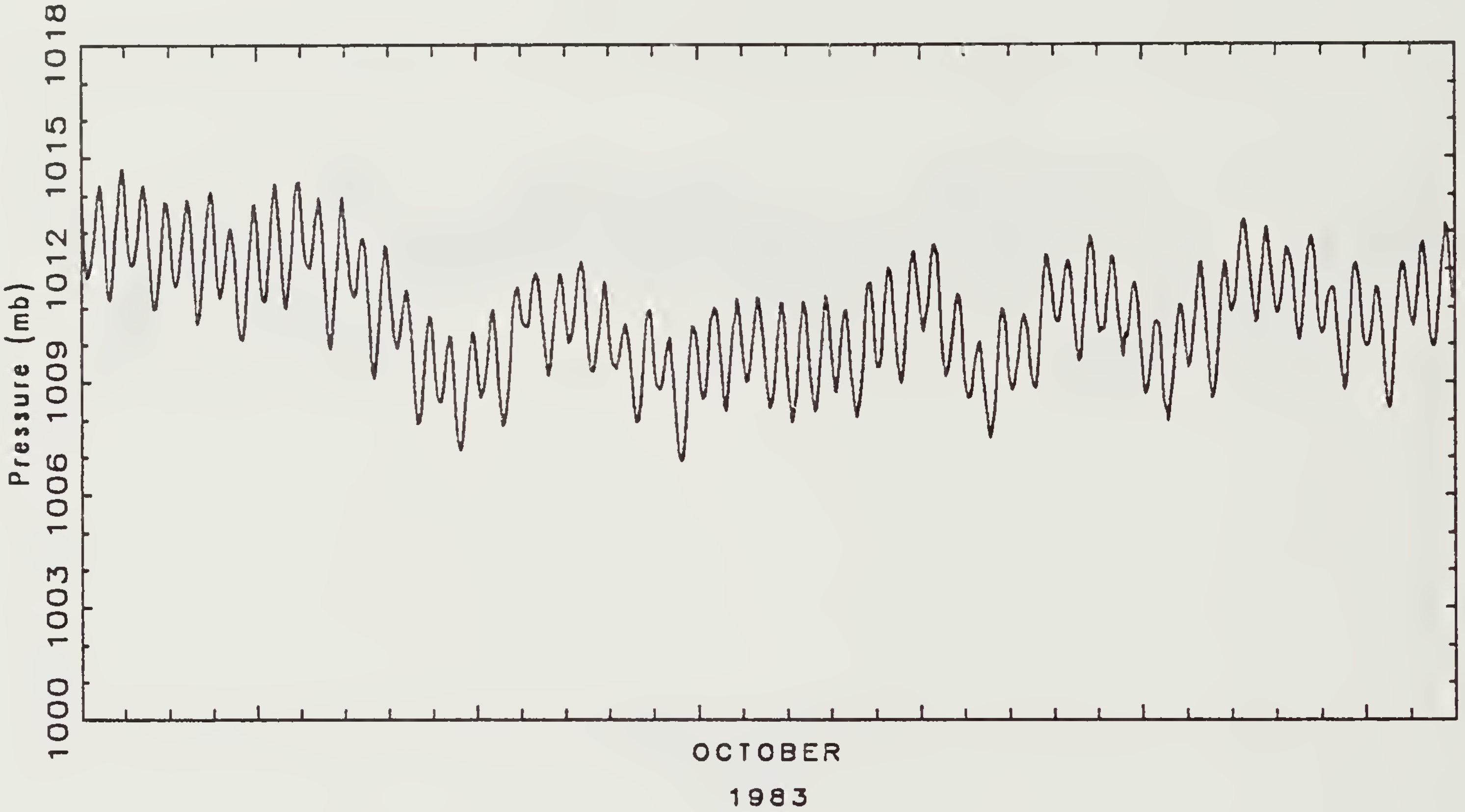

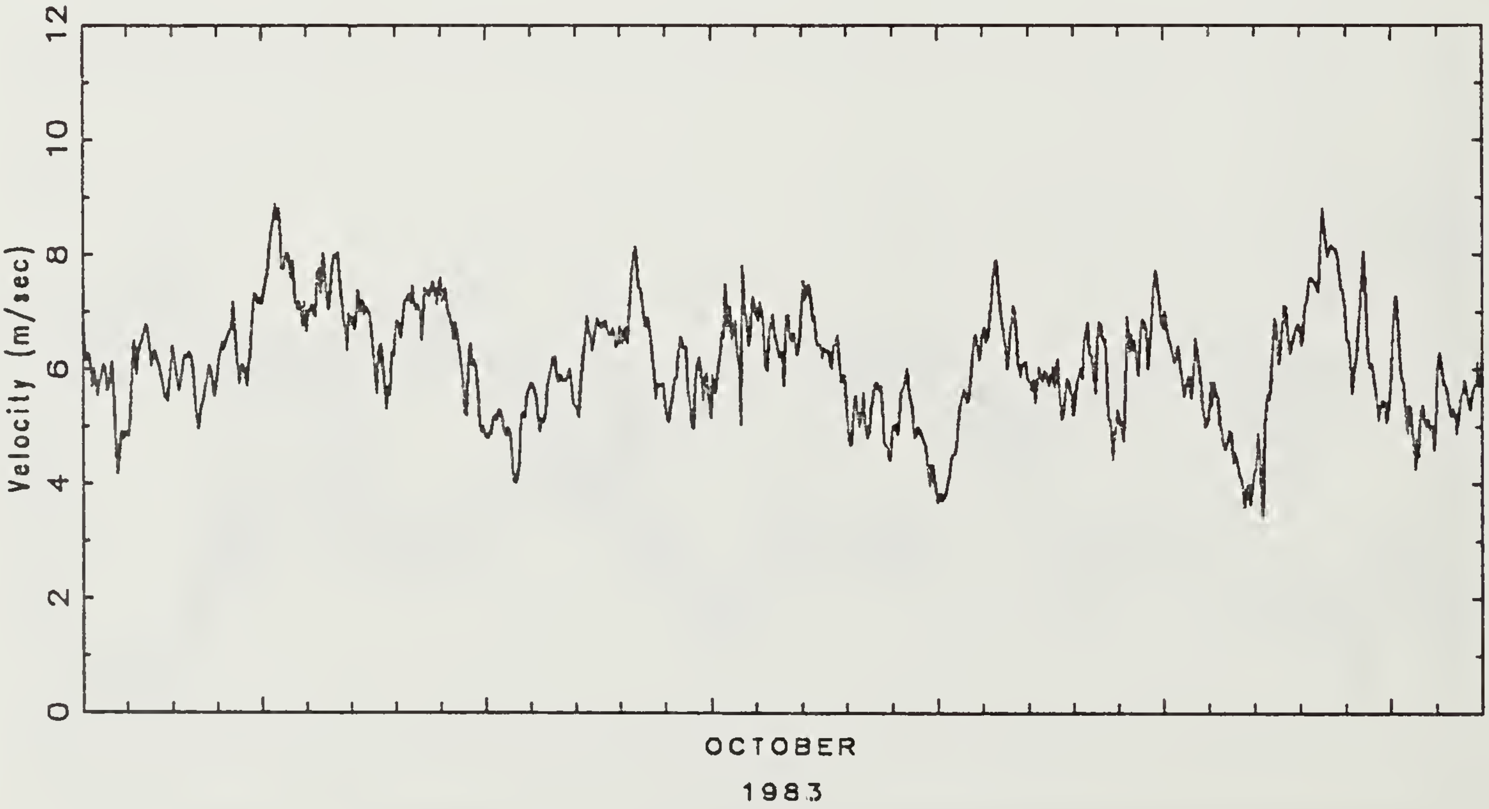

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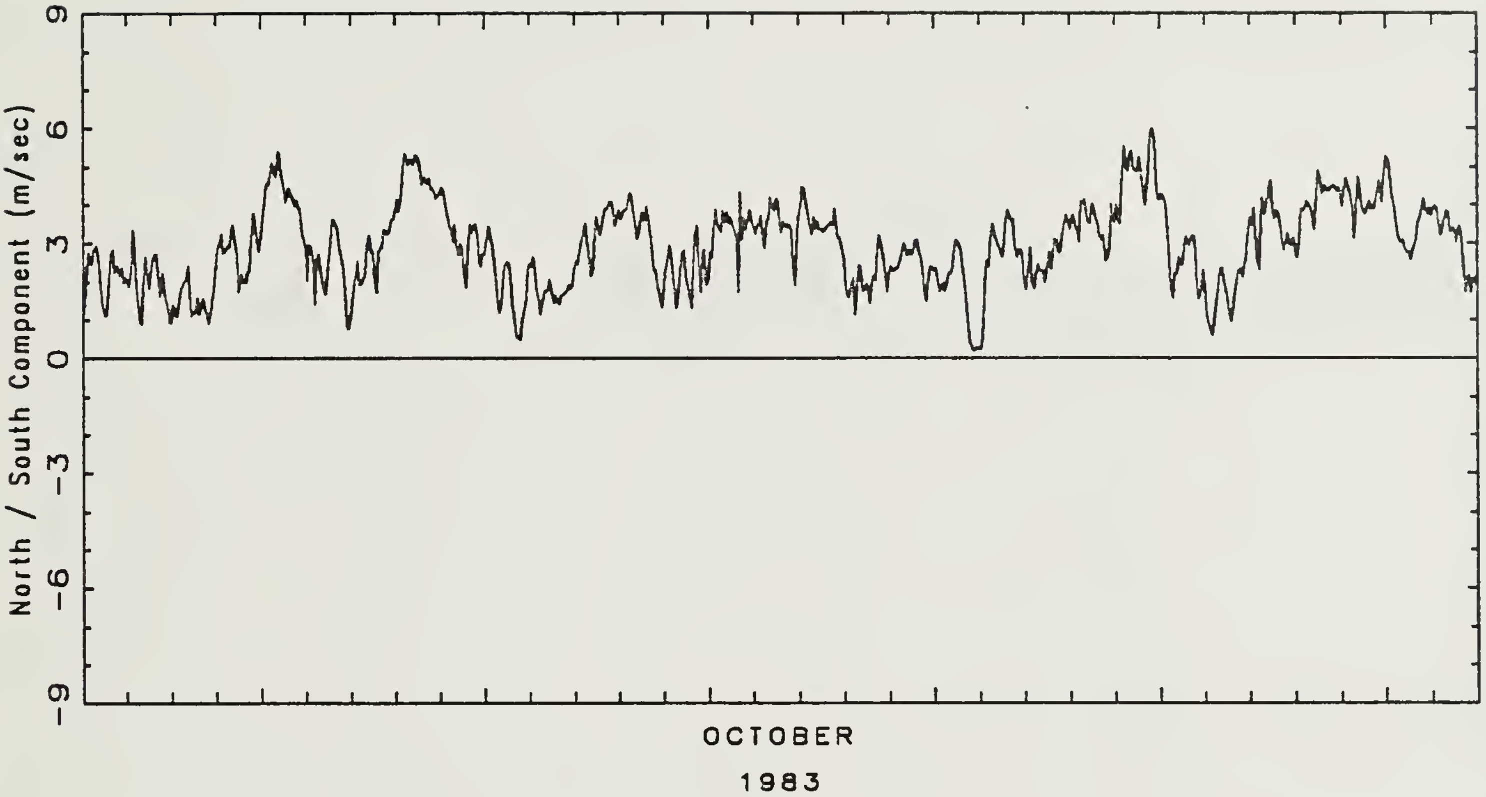
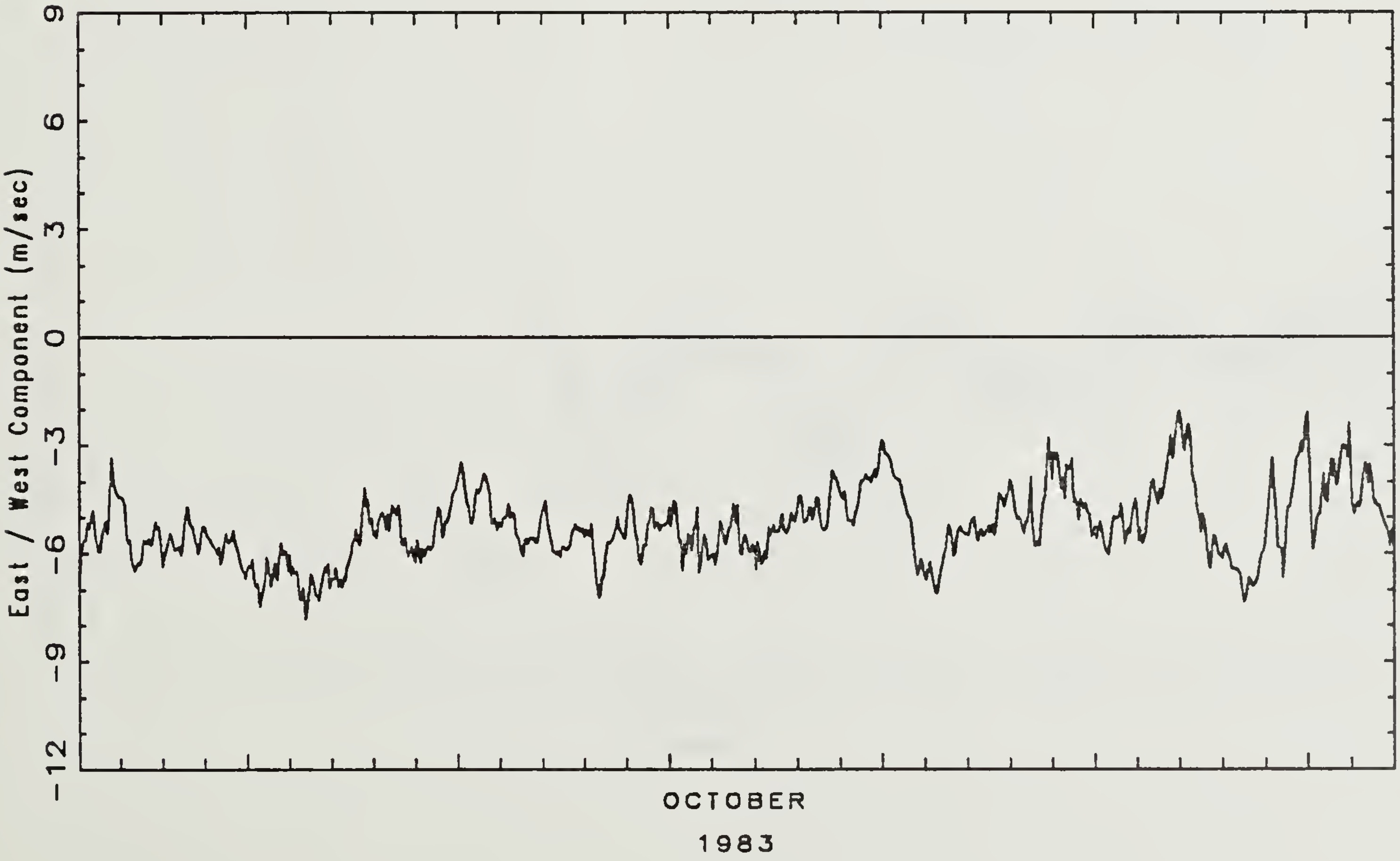
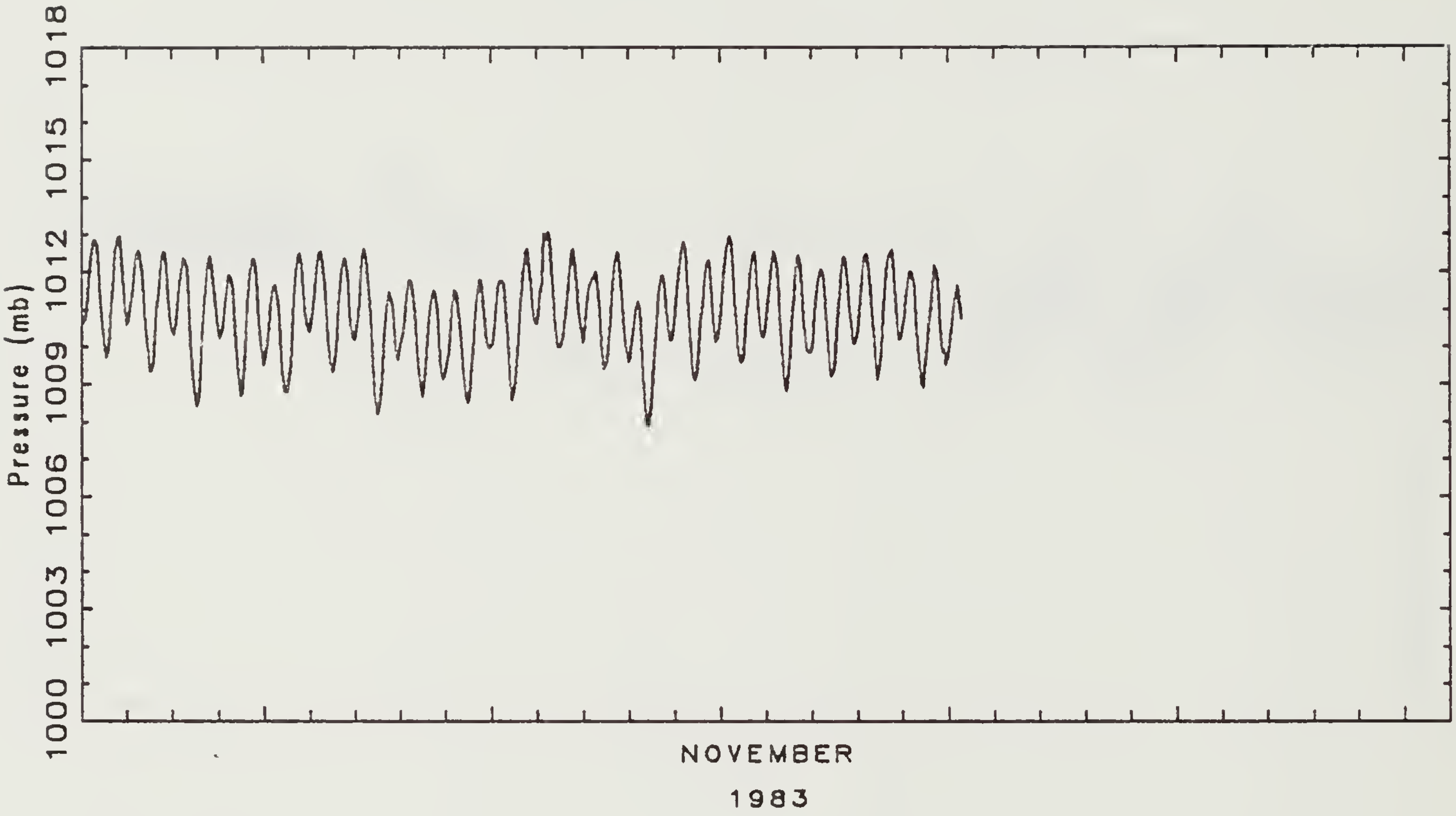
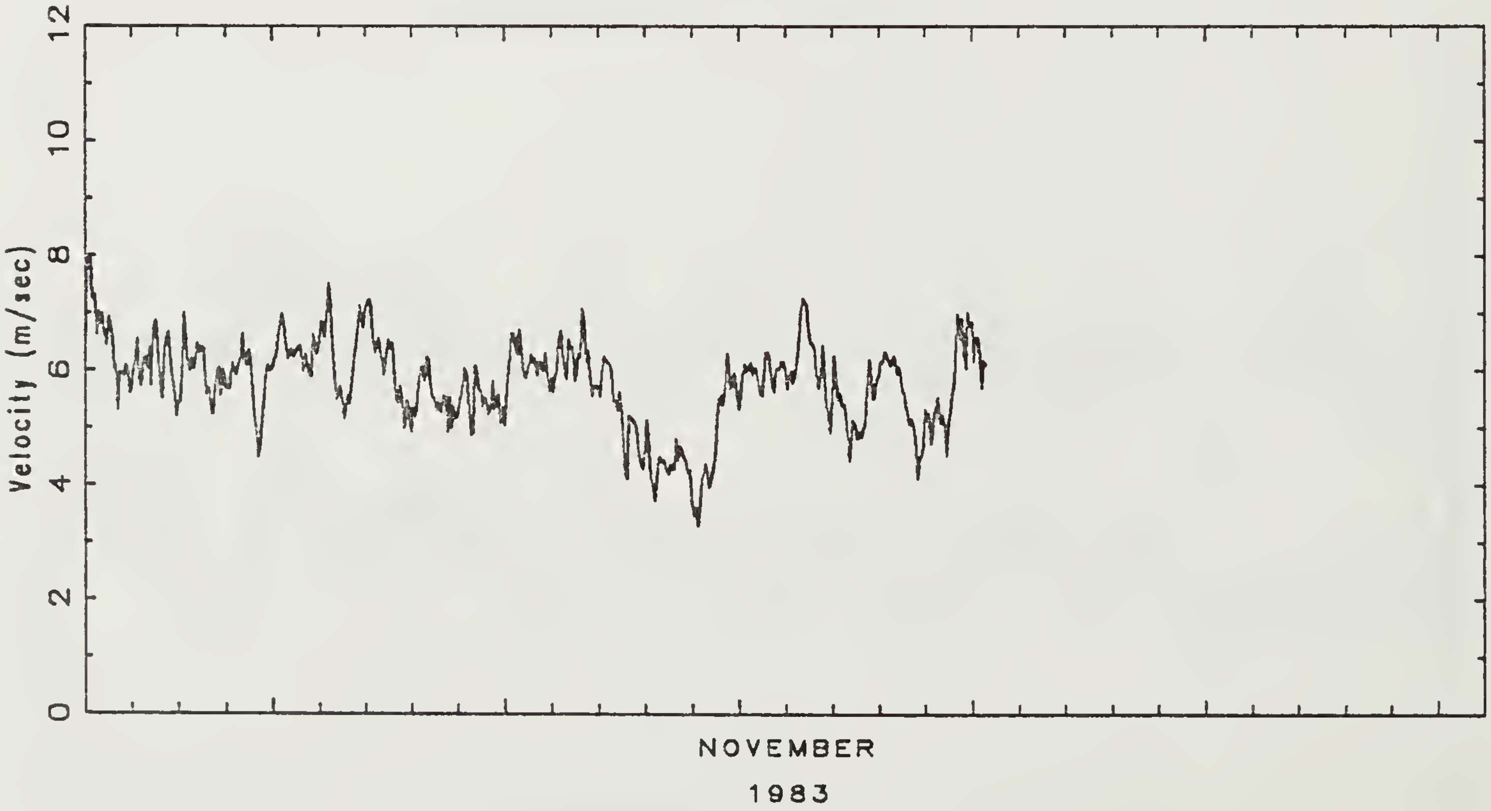


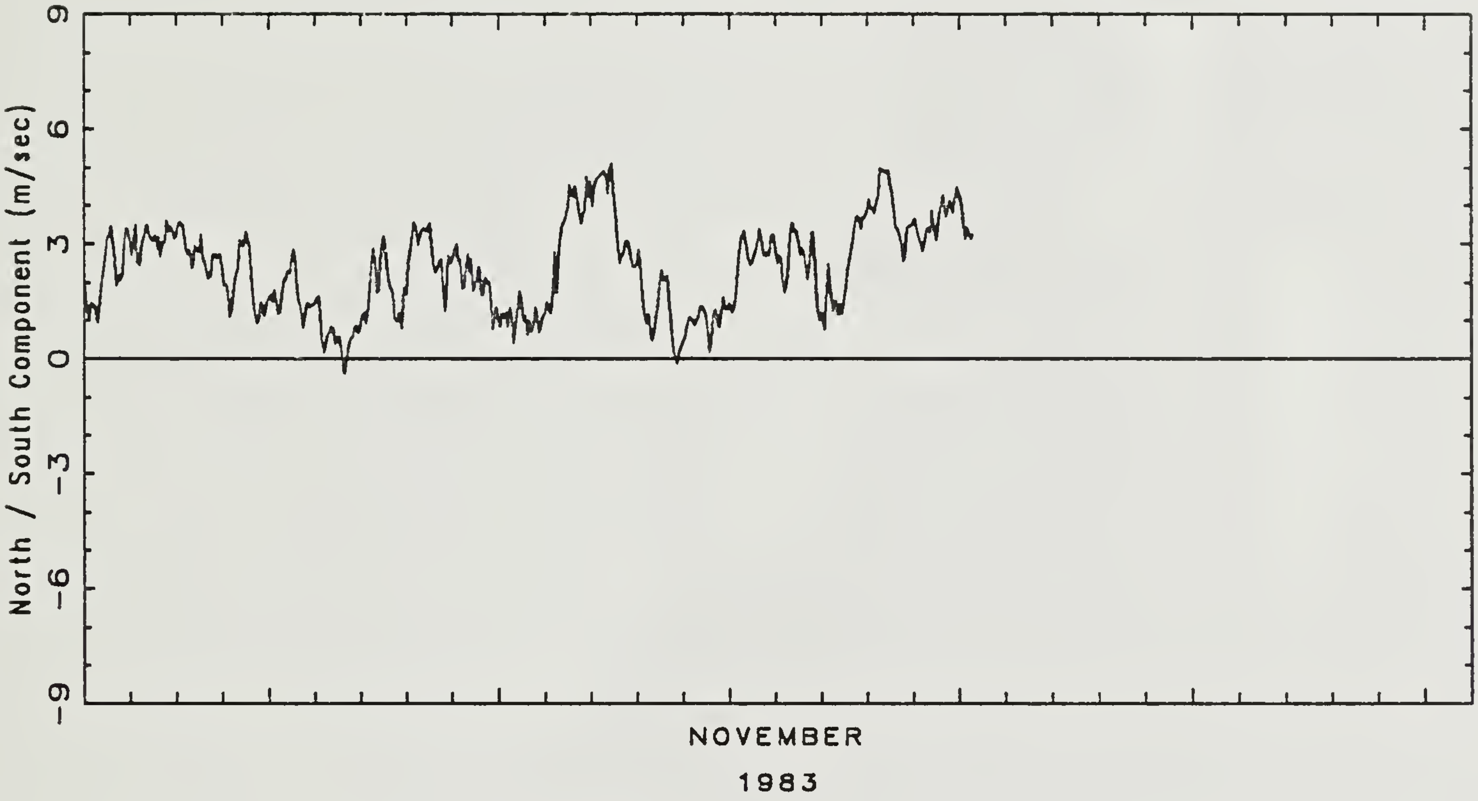


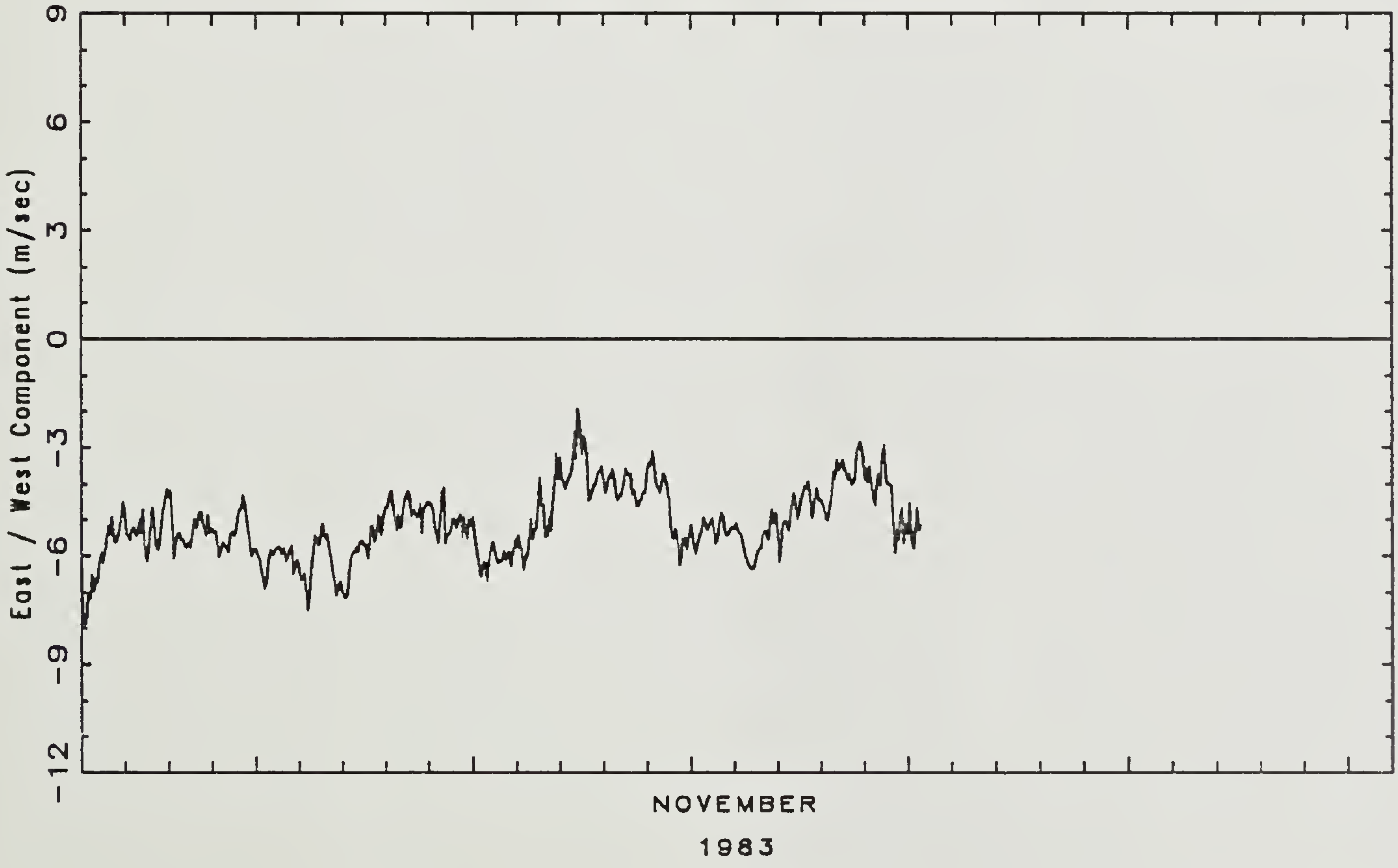
November 1983





November 1983

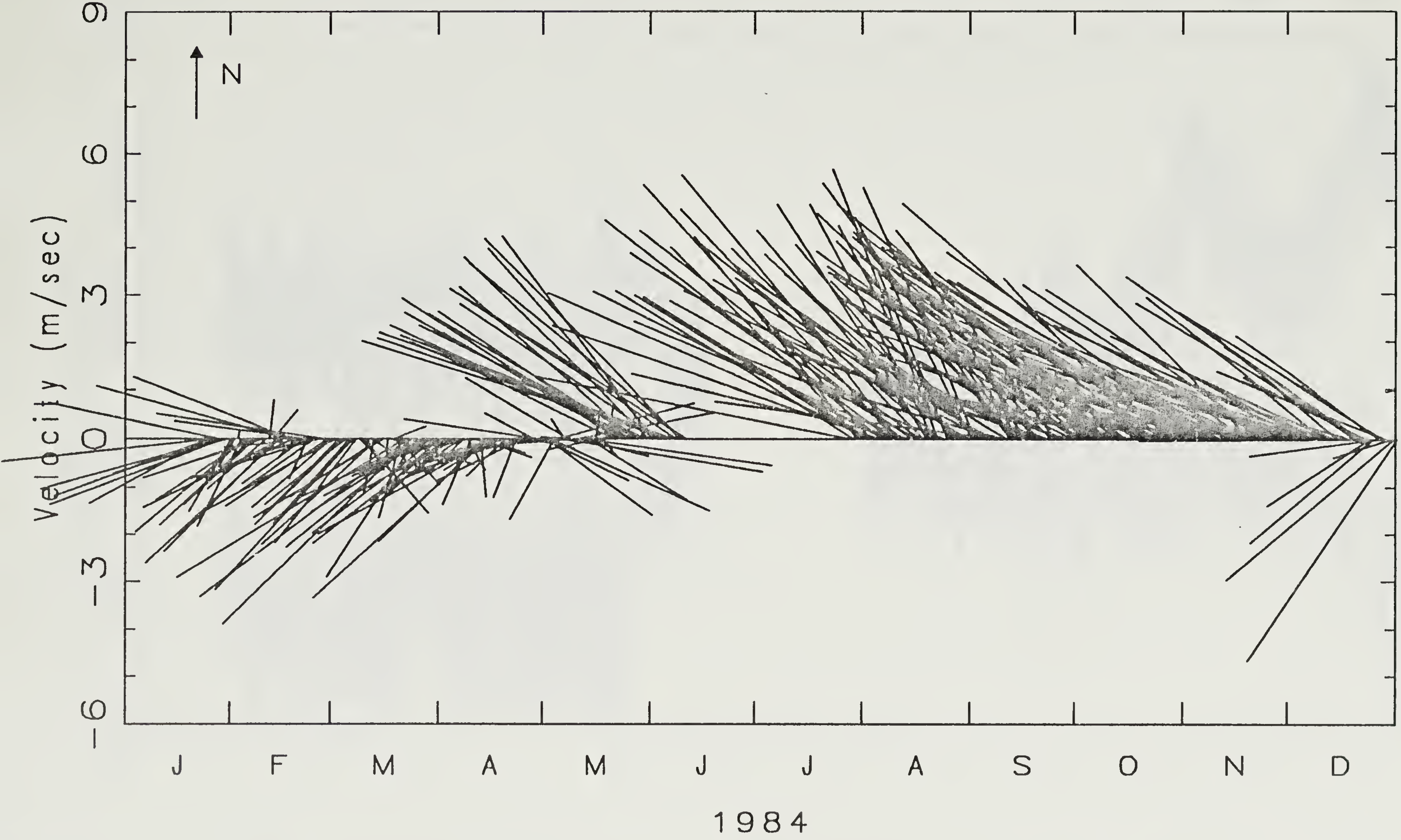


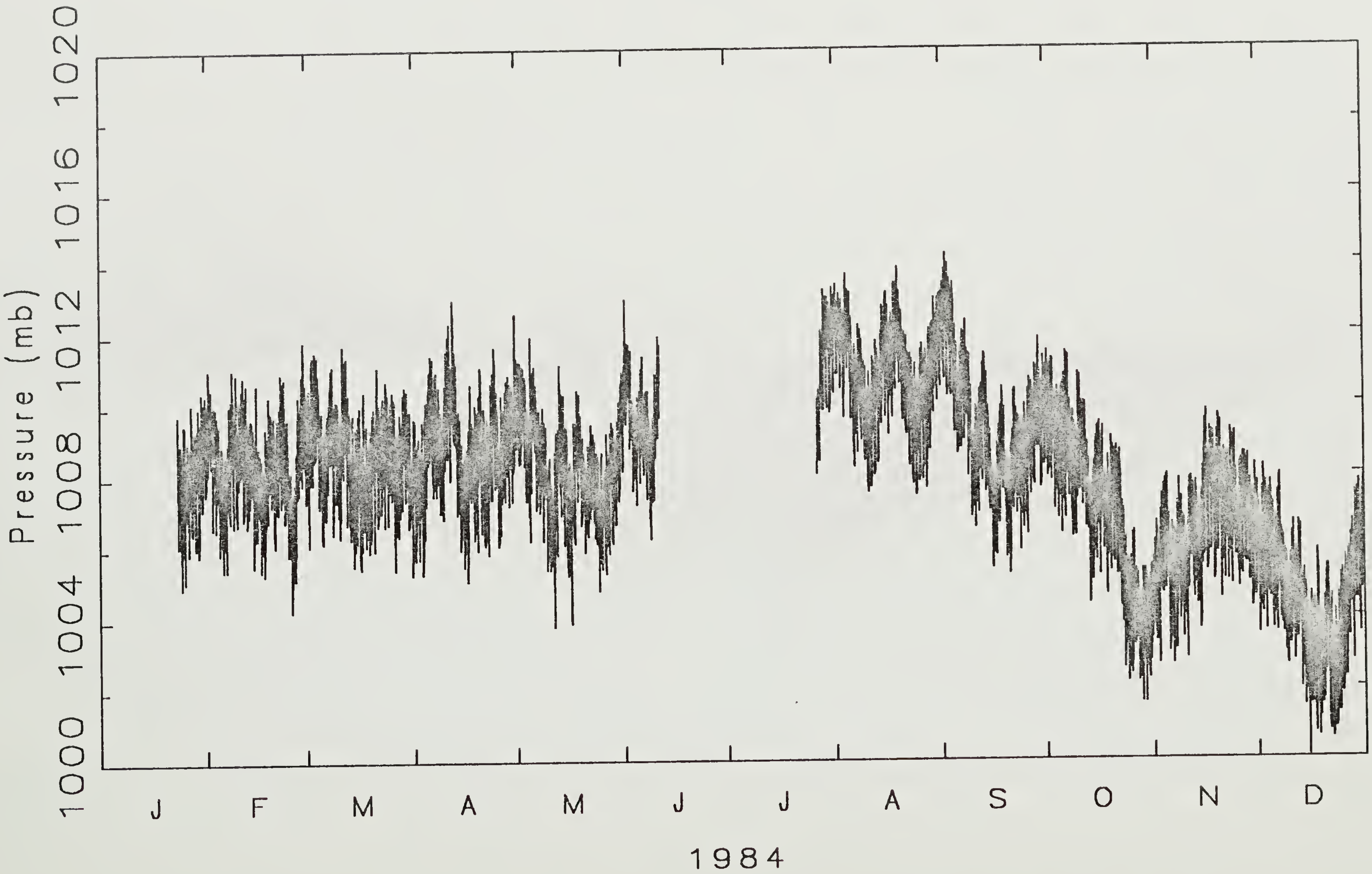


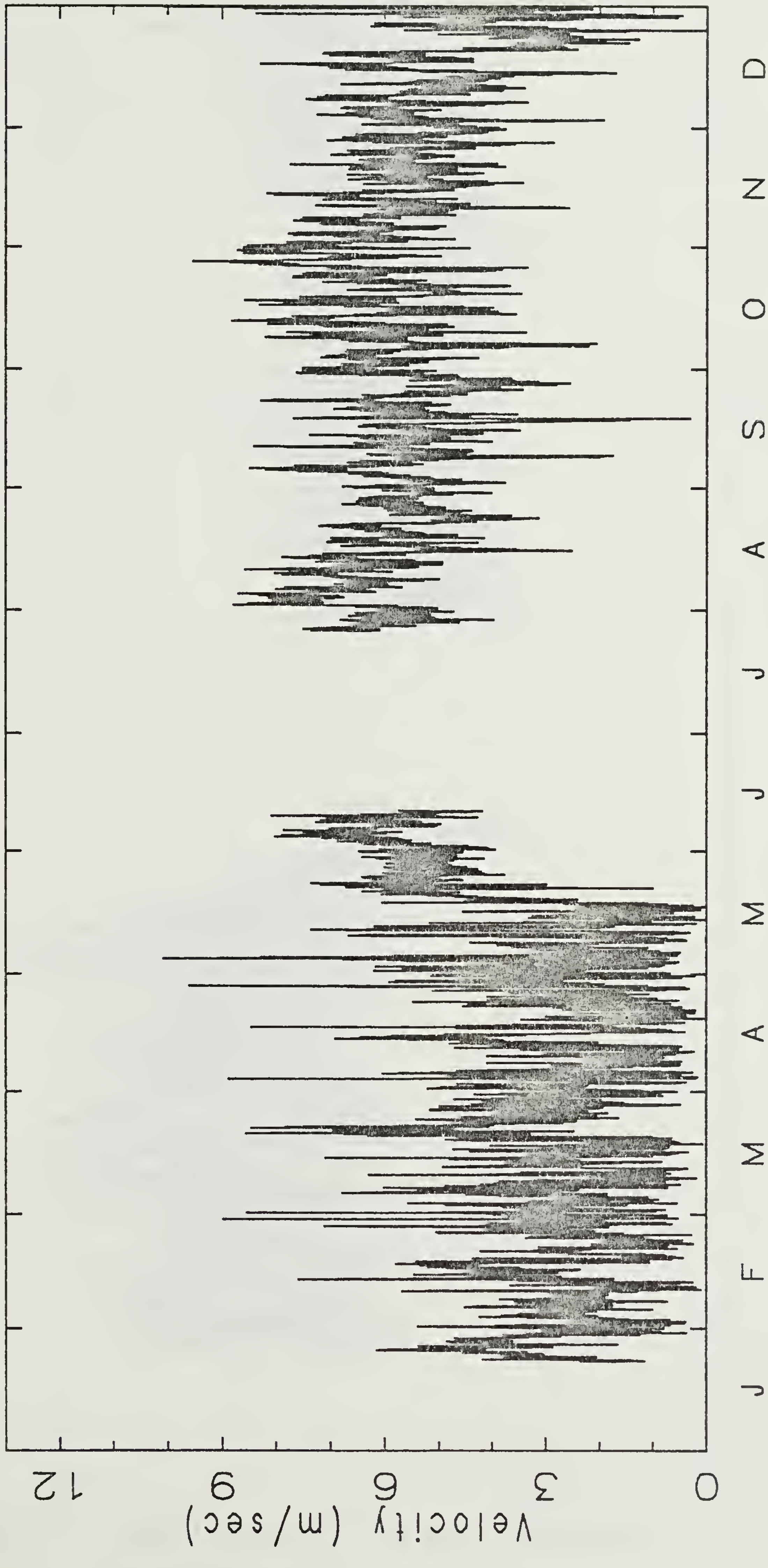
1984

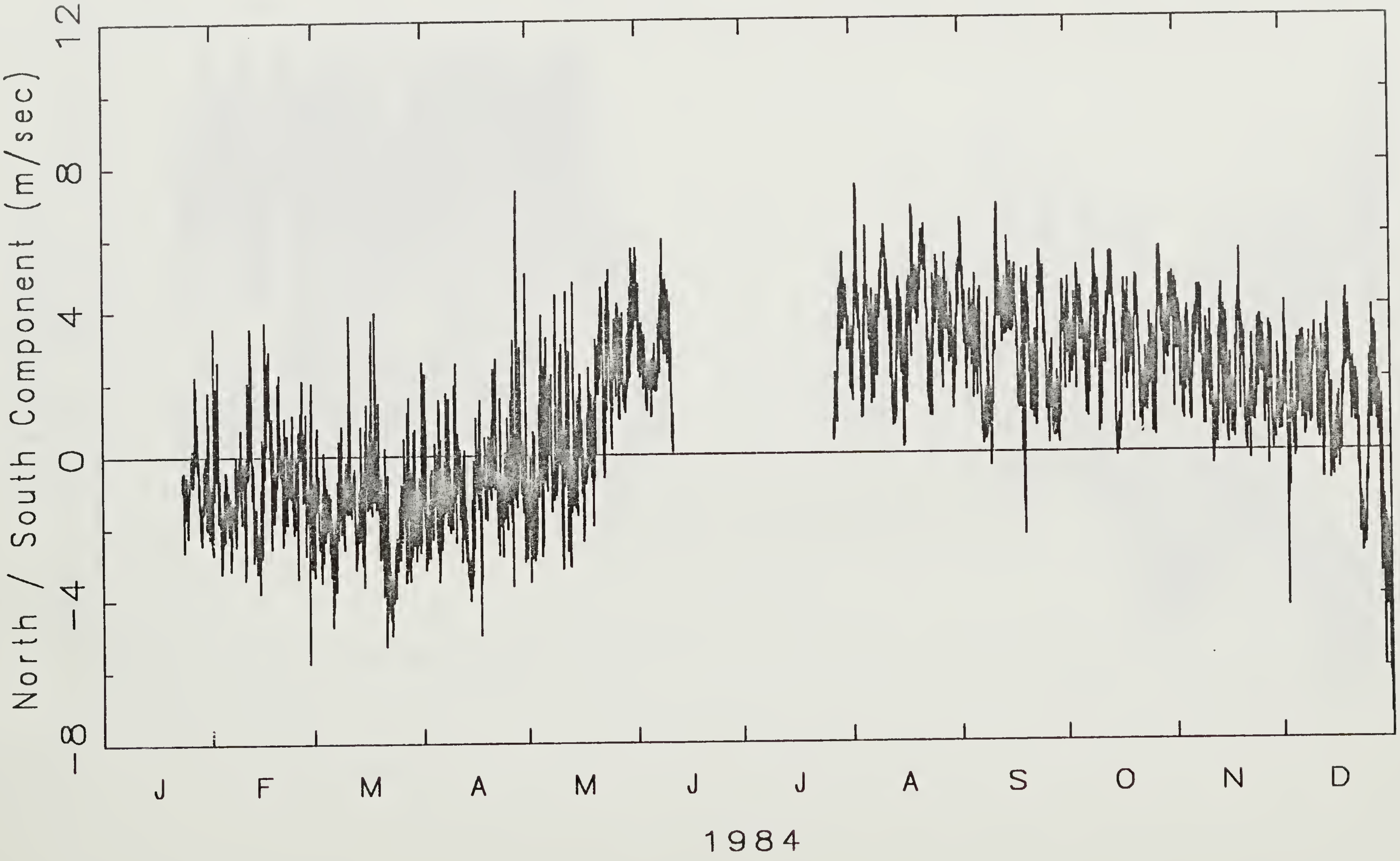
January 23 to June 11 July 26 to December 31

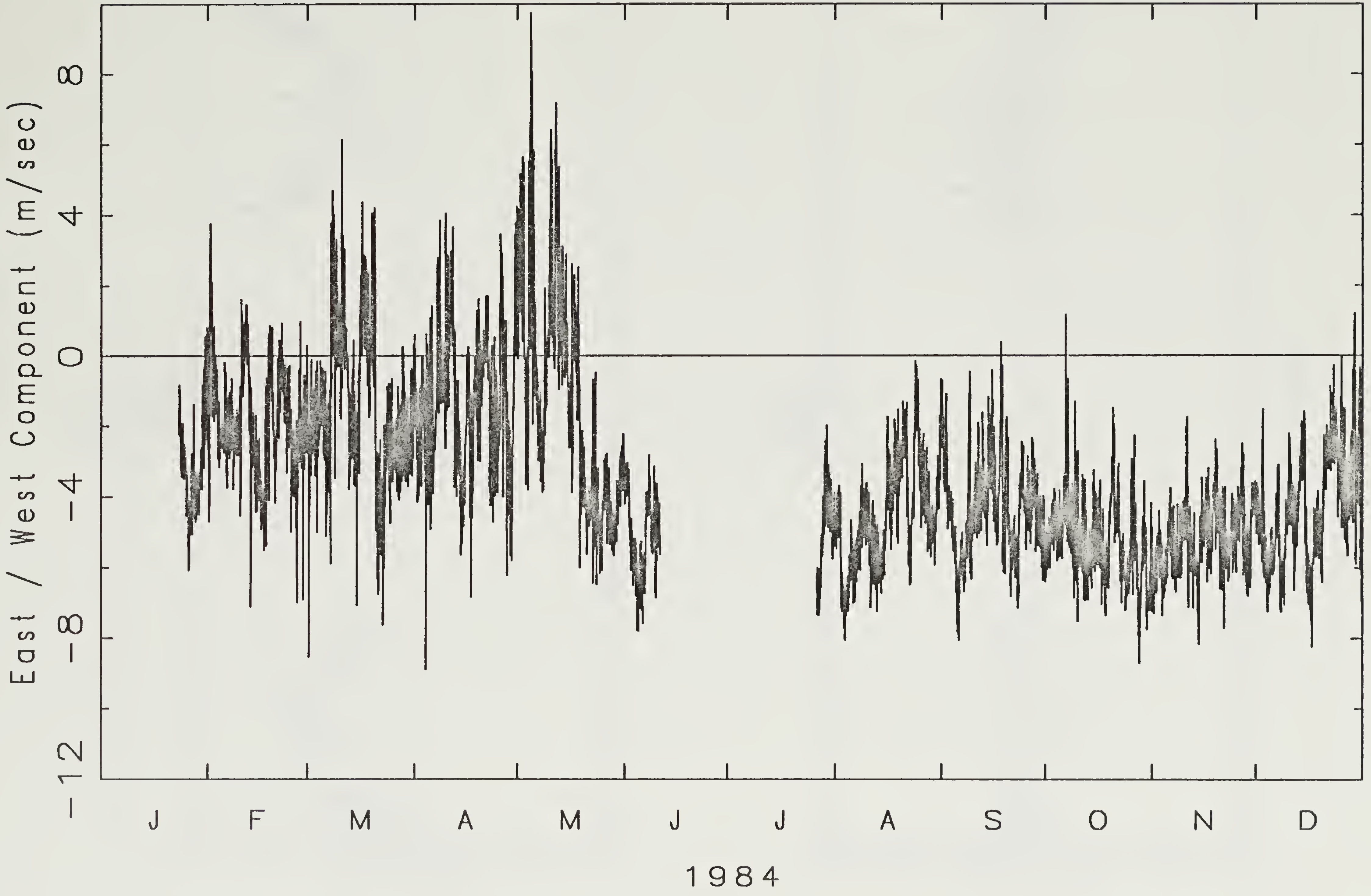
1984




Pressure (mb)
1000
1004
1008
1012
1016
1020
J
F
M
A
M
J
J
A
S
O
N
D
1984

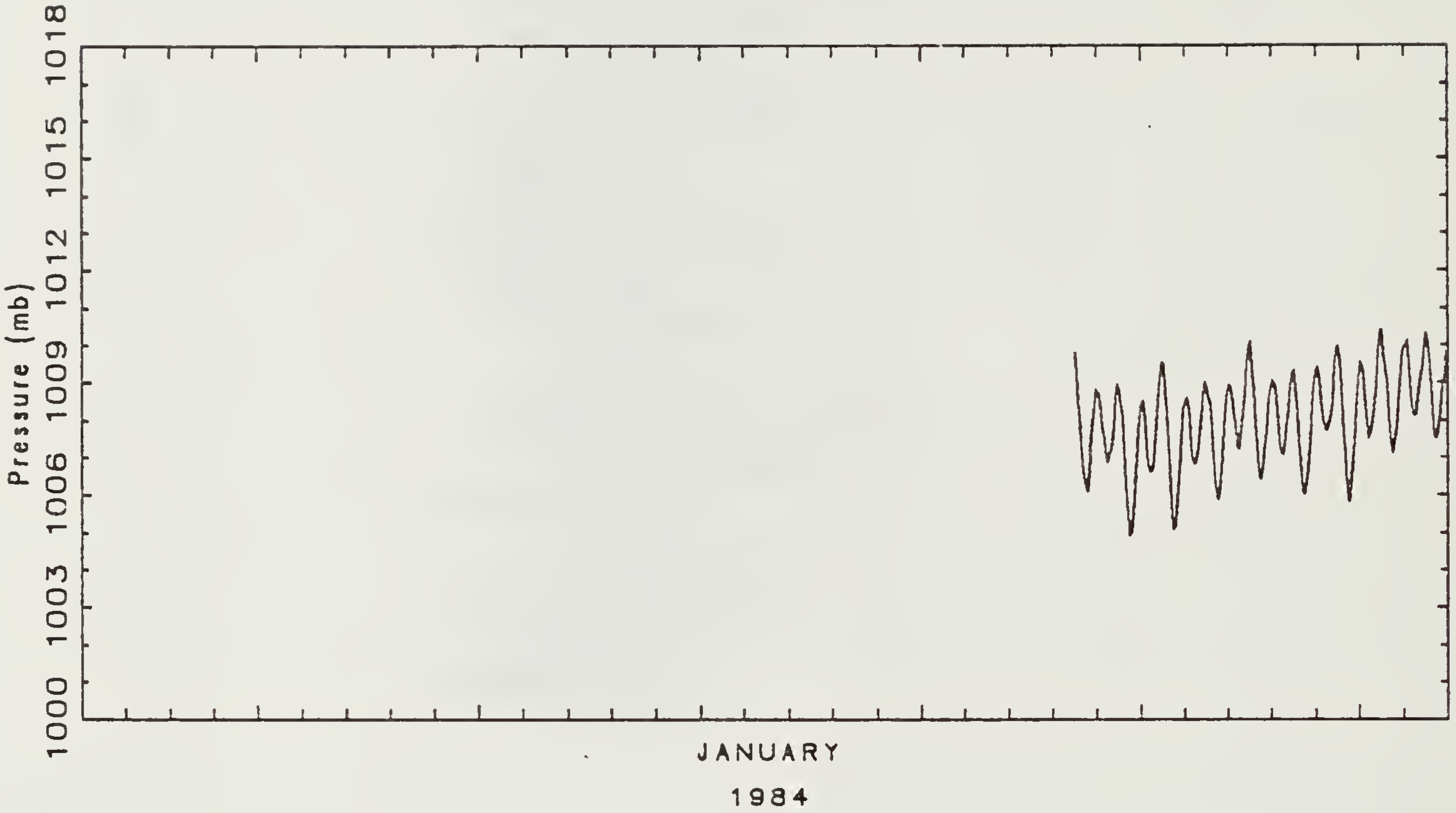

Velocity (m/sec)
0
3
6
9
12
J
F
M
A
M
J
J
A
S
O
N
D
1984

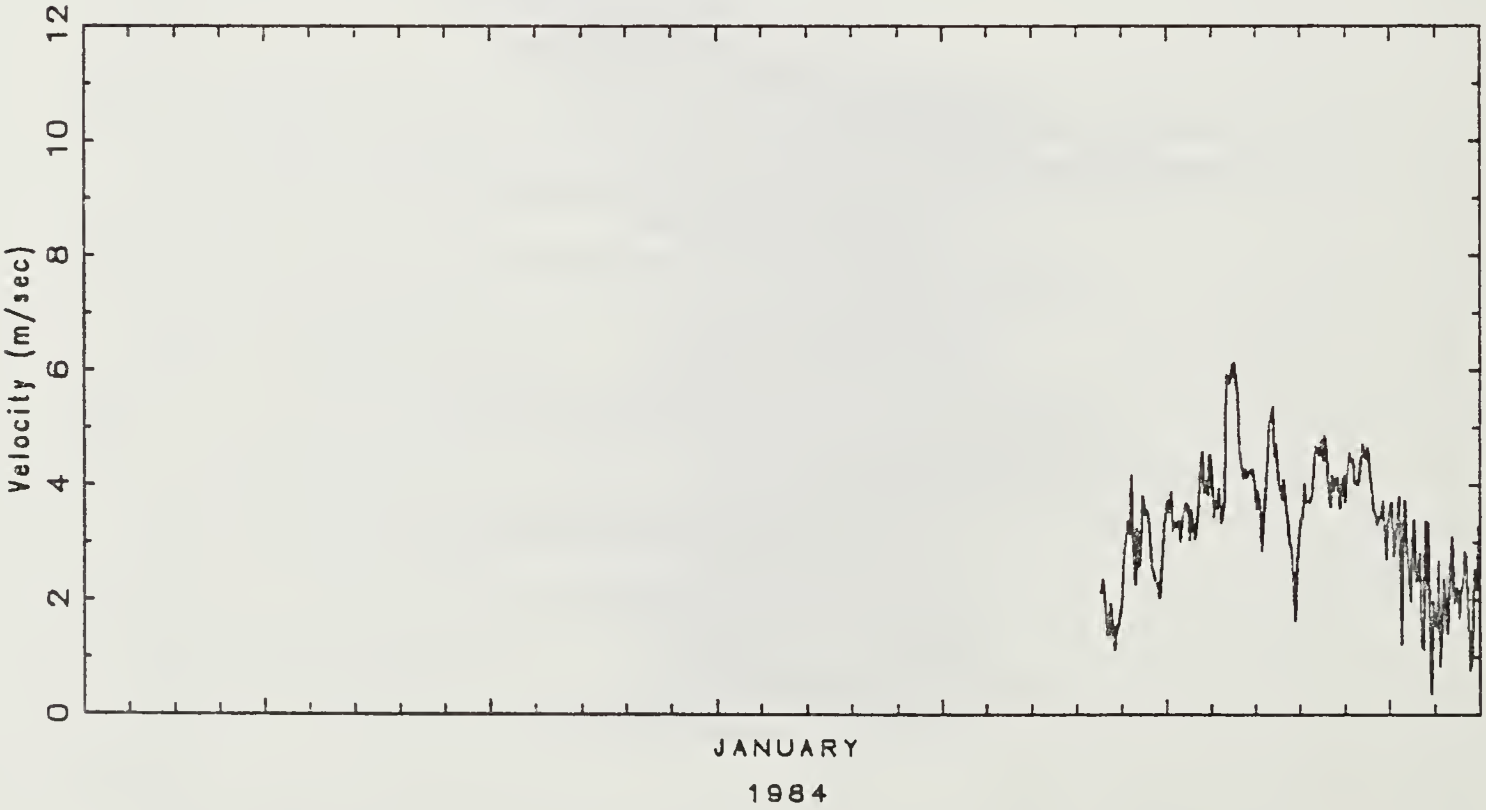

North / South Component (m/sec)
12
8
4
0
-4
-8
J
F
M
A
M
J
J
A
S
O
N
D
1984



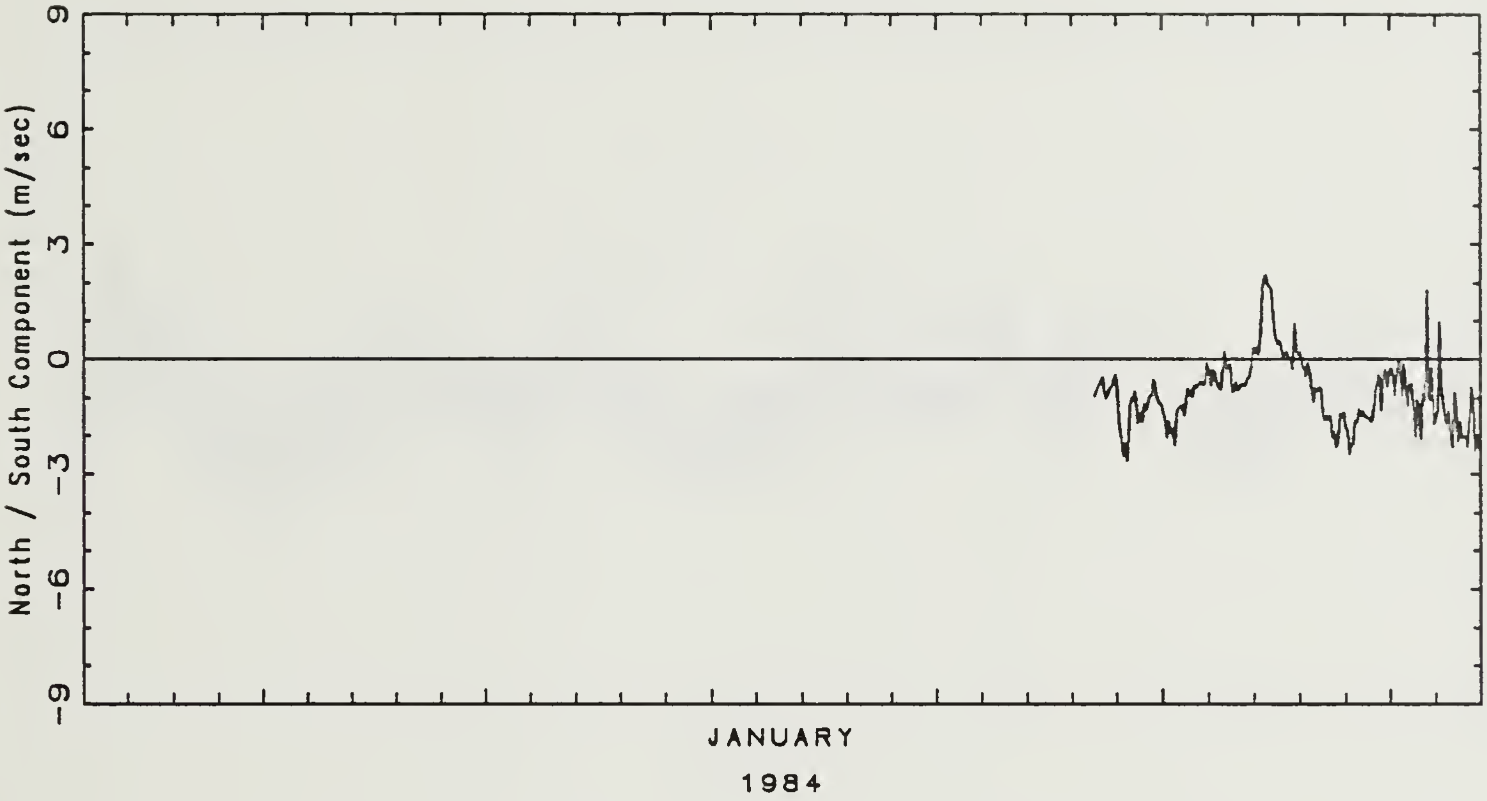
East / West Component (m/sec)
8
4
0
-4
-8
-12
J
F
M
A
M
J
J
A
S
O
N
D
1984

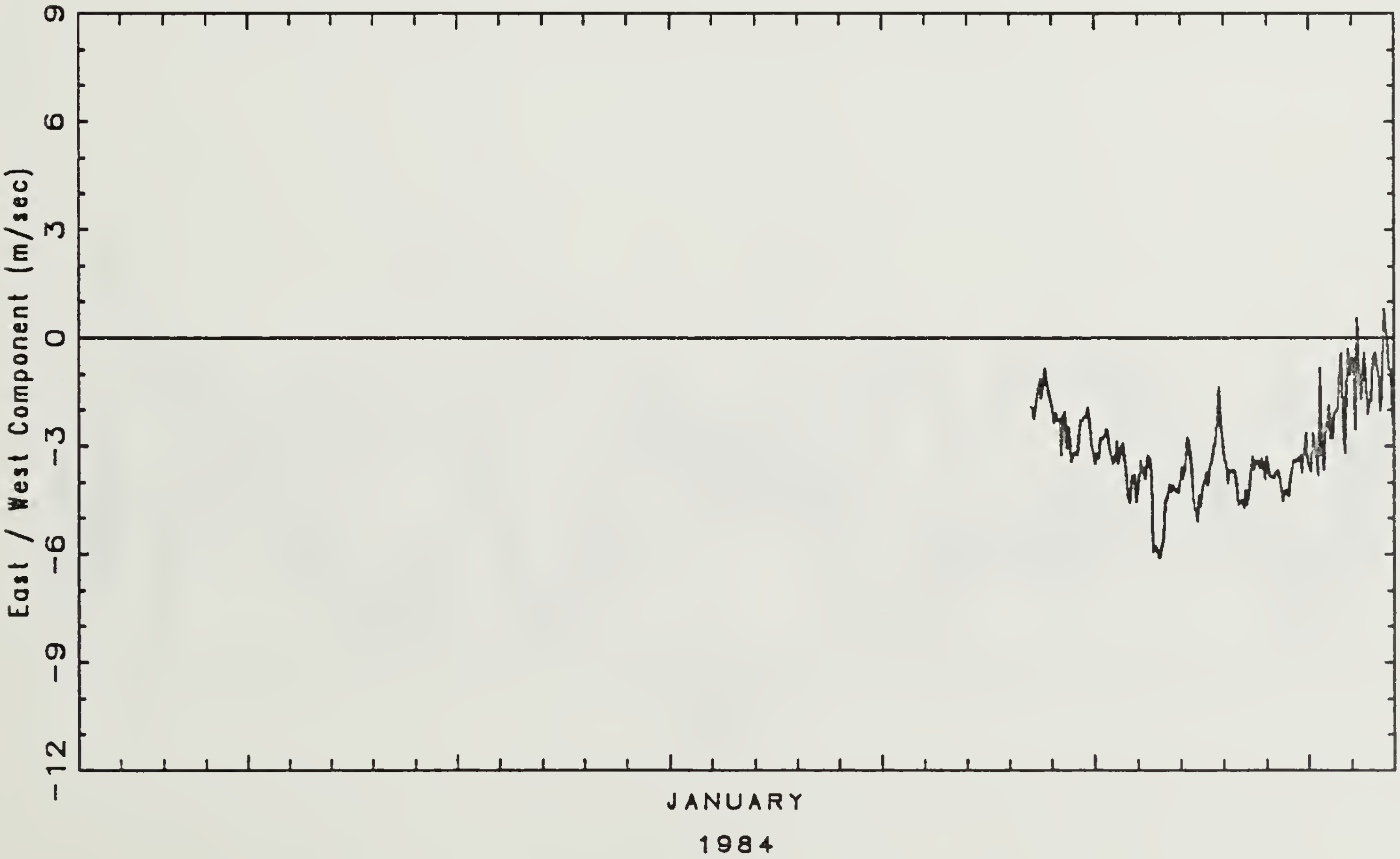
January 1984



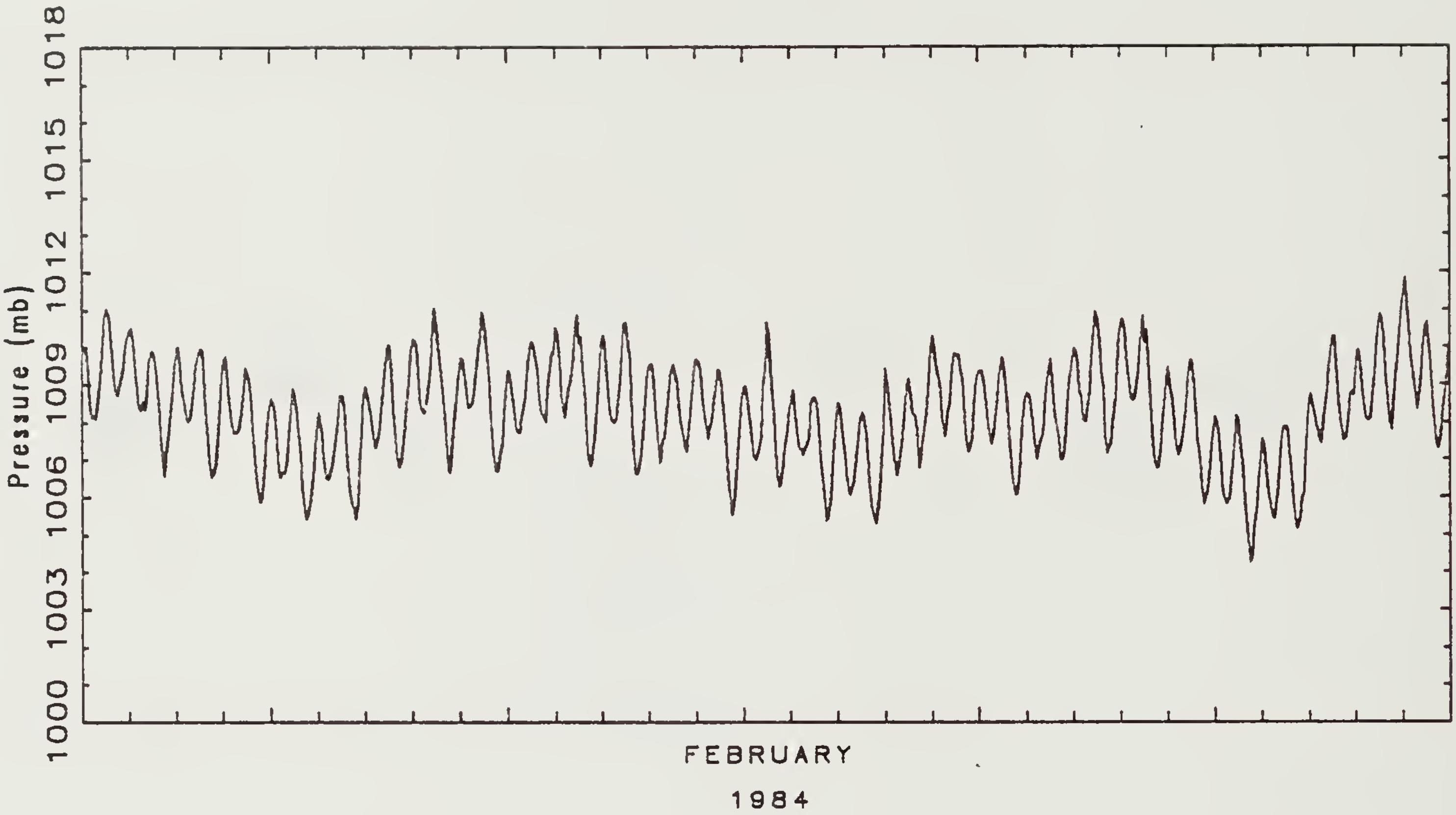


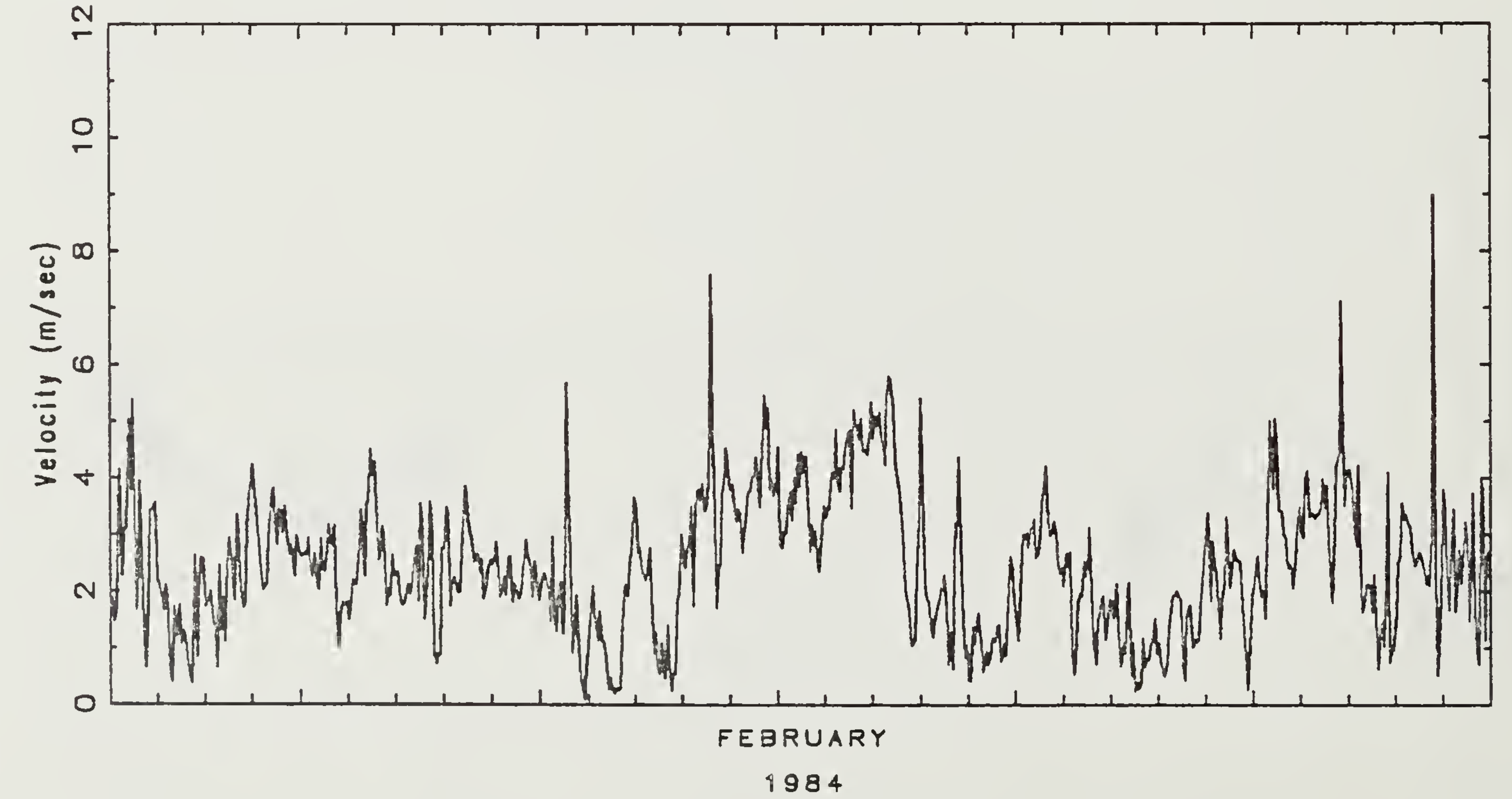
January 1984



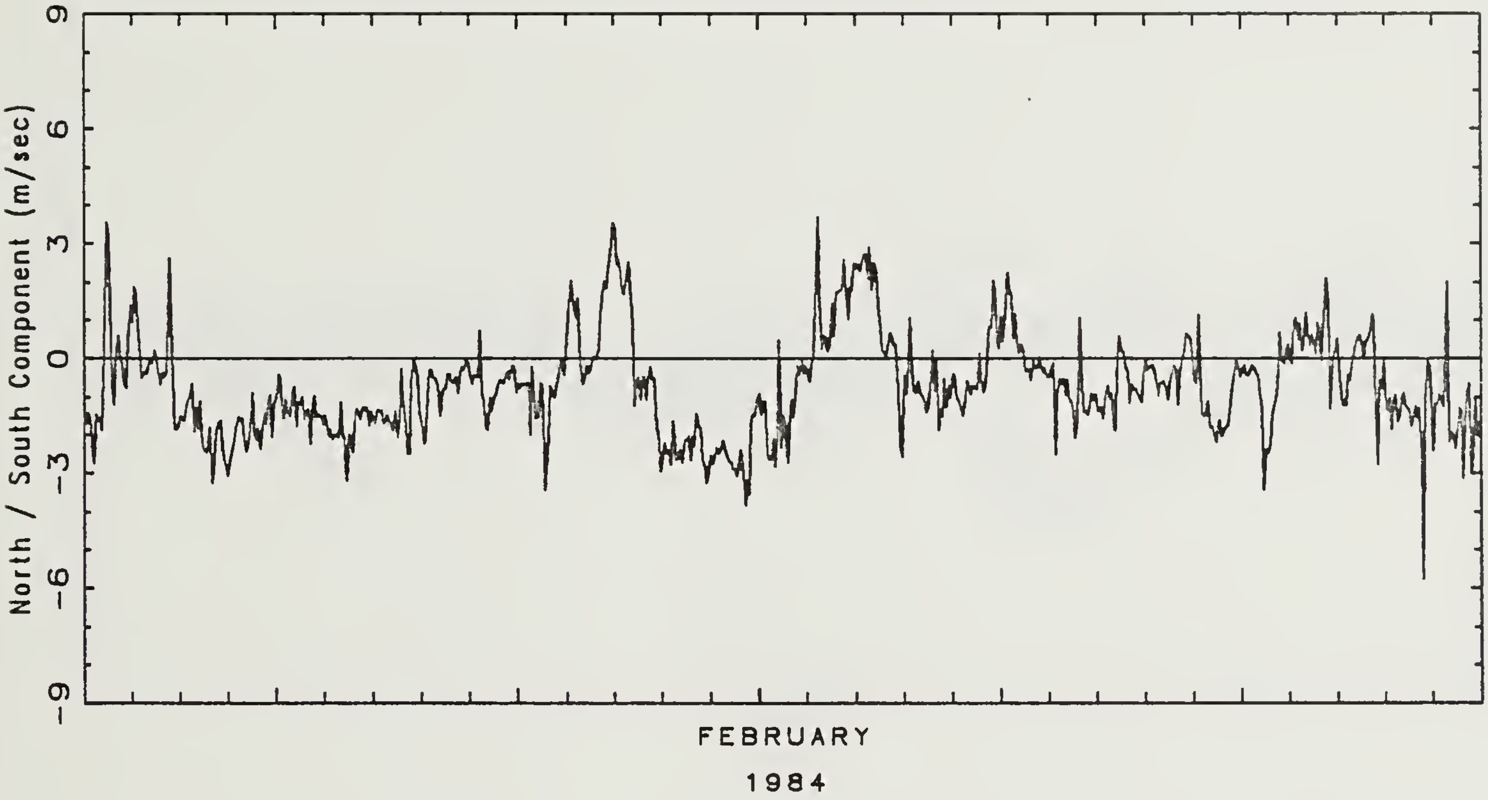


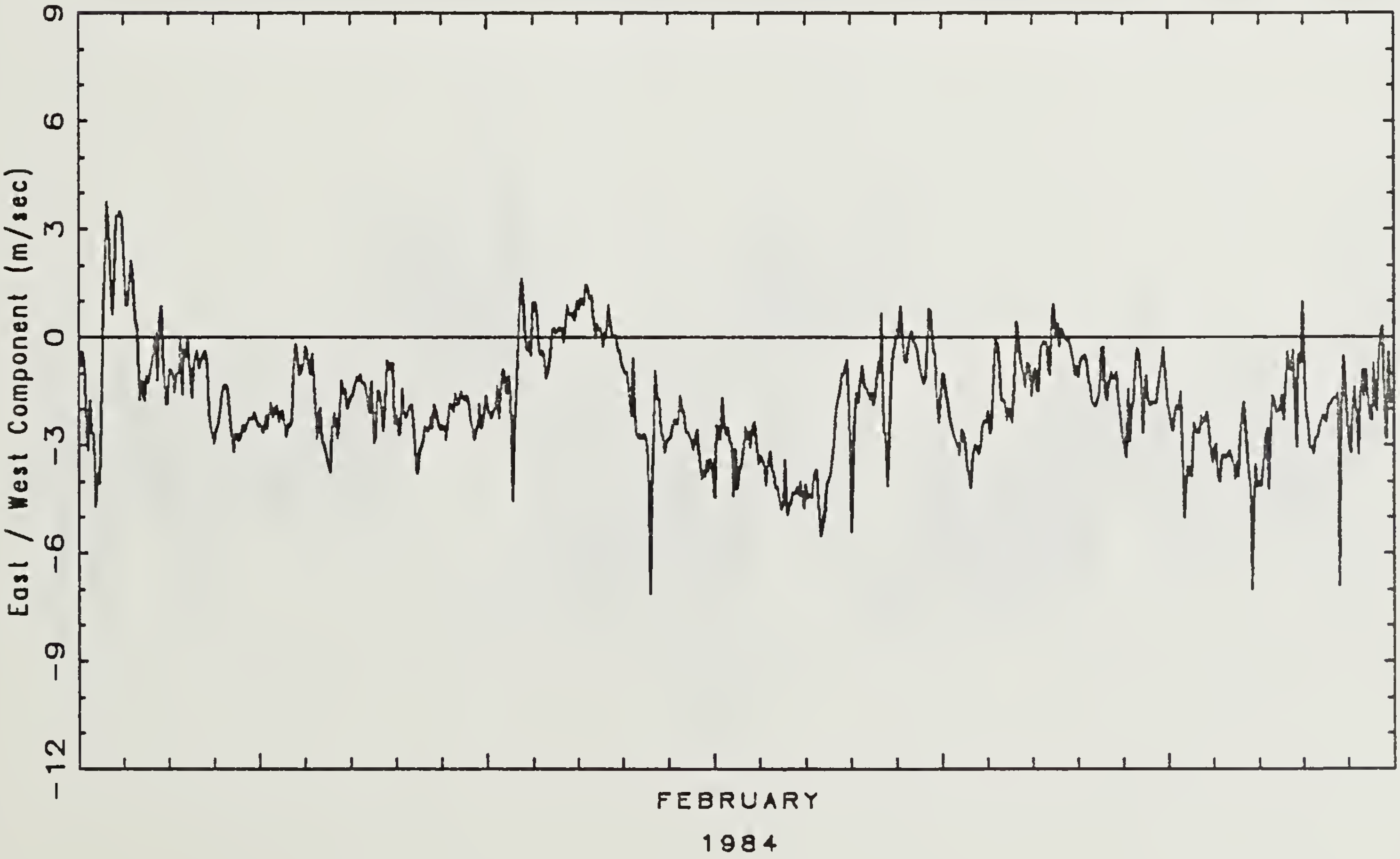
February 1984



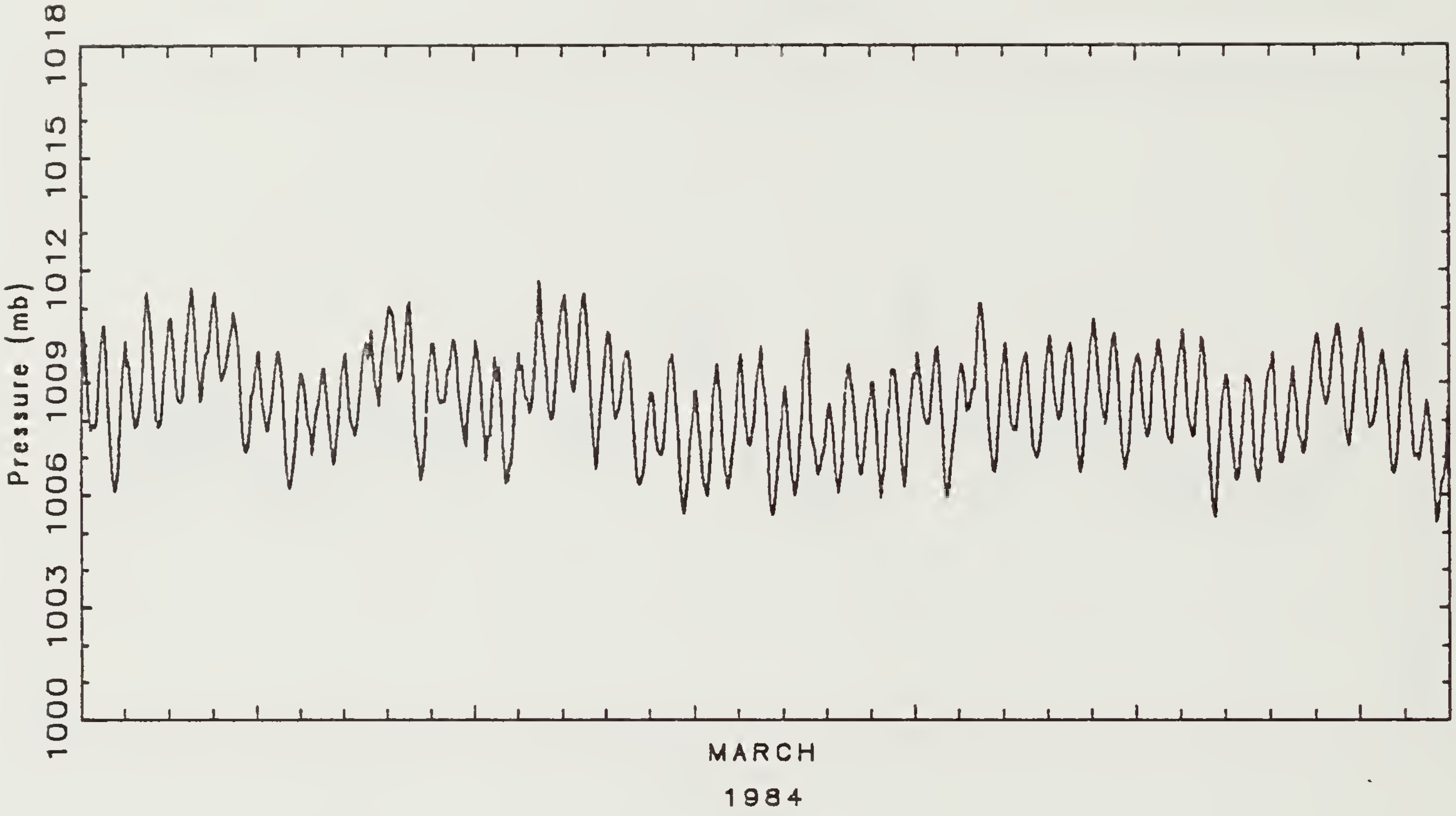


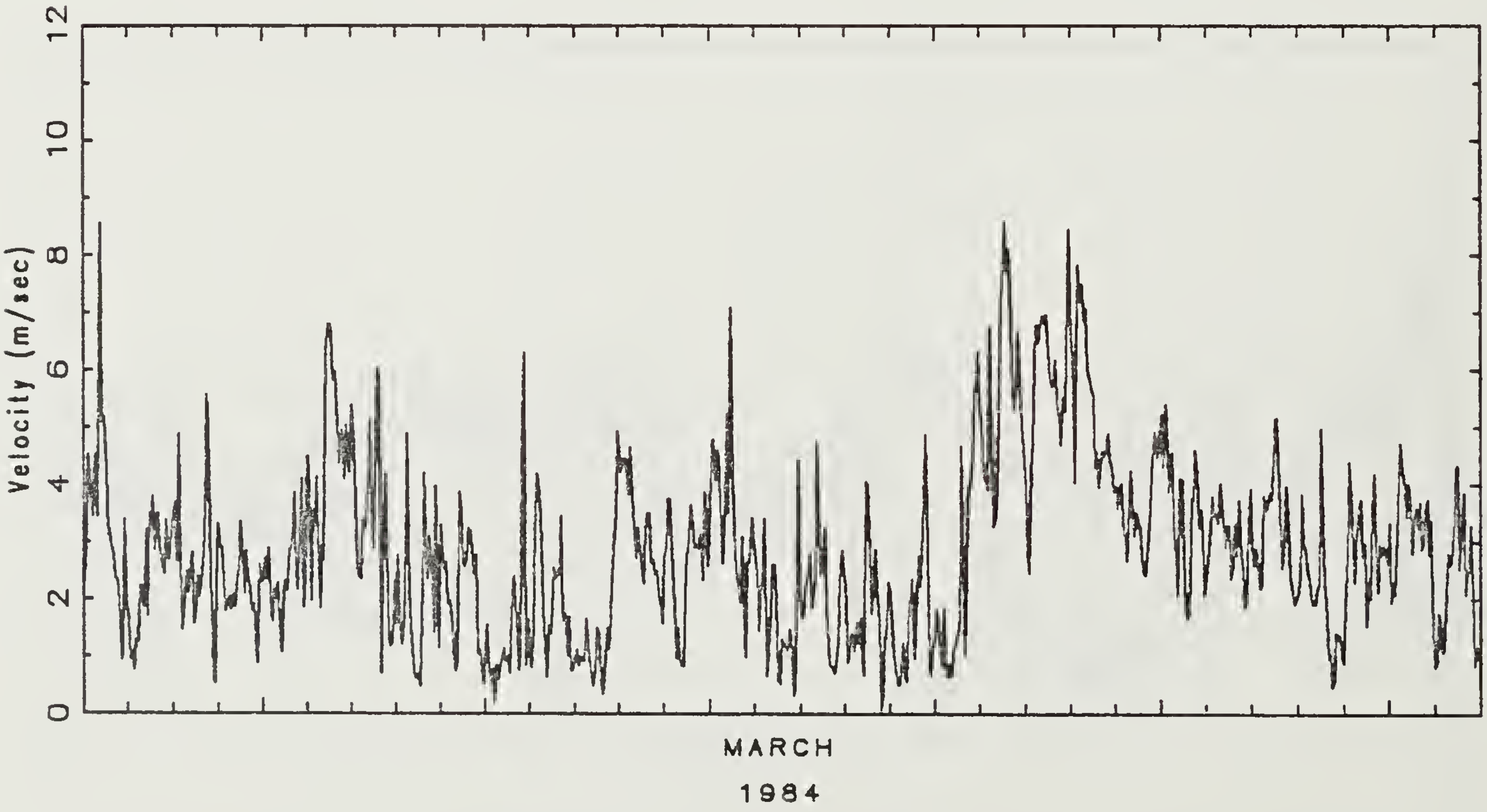
February 1984



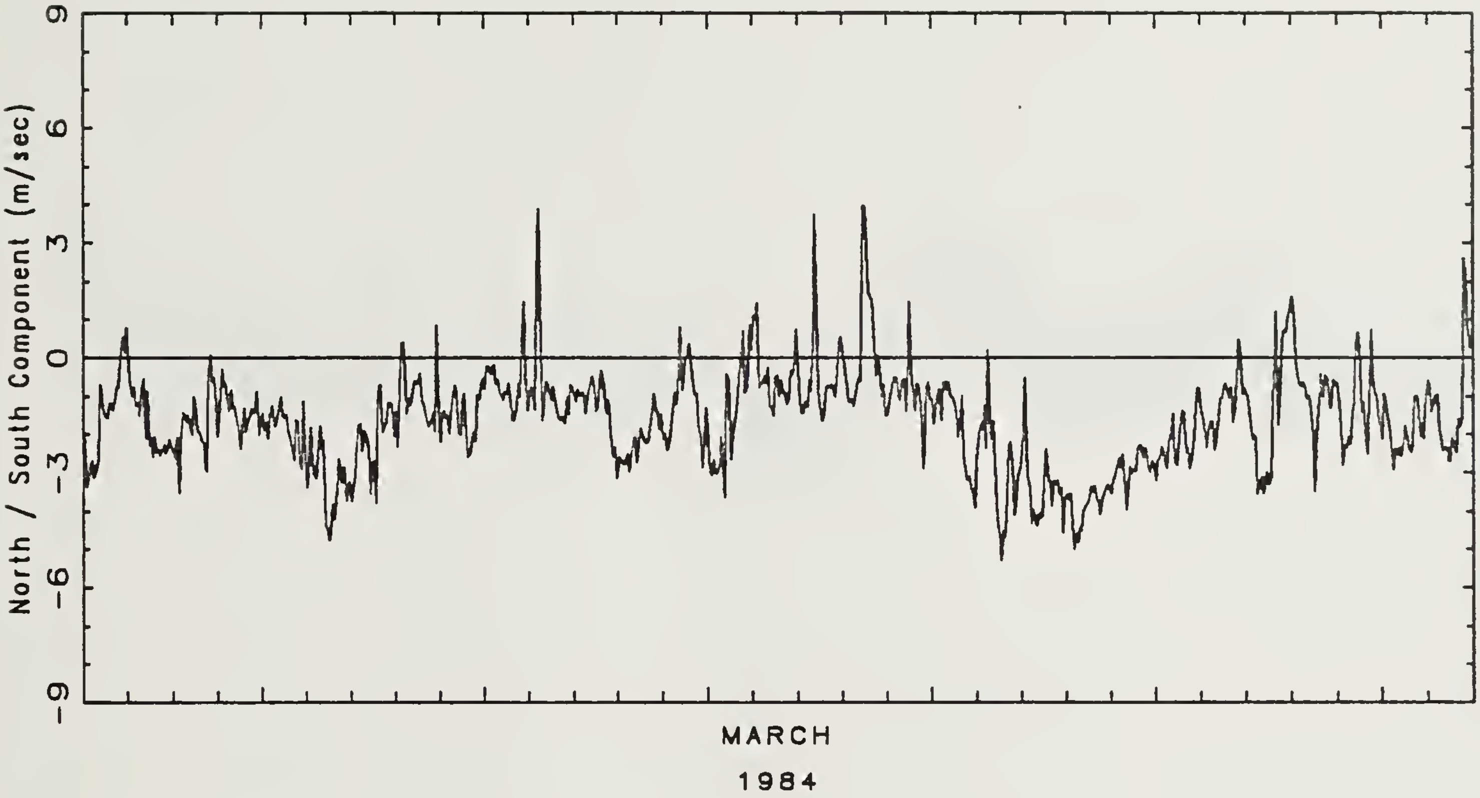


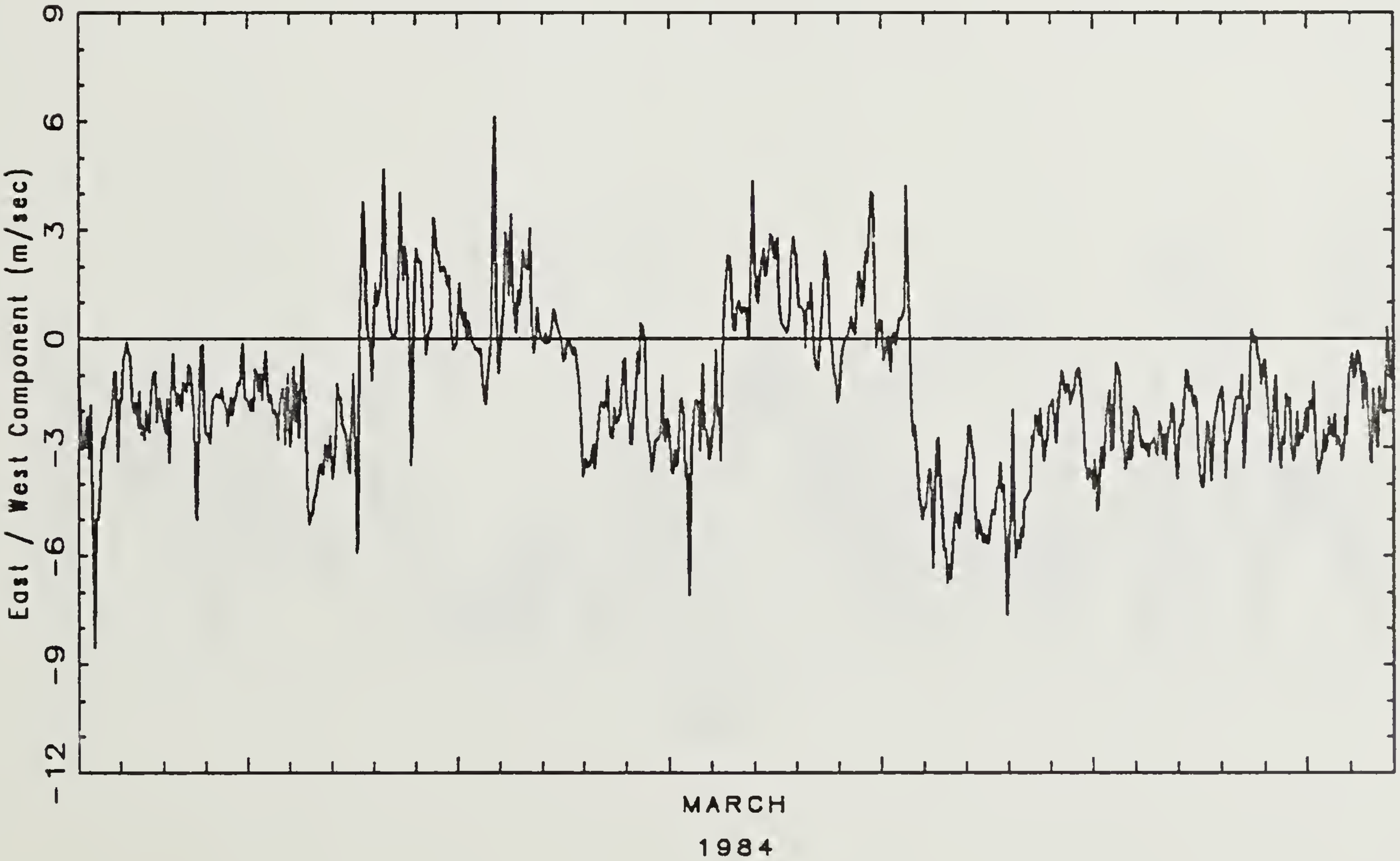
March 1984


Pressure (mb)
1000
1003
1006
1009
1012
1015
1018
MARCH
1984

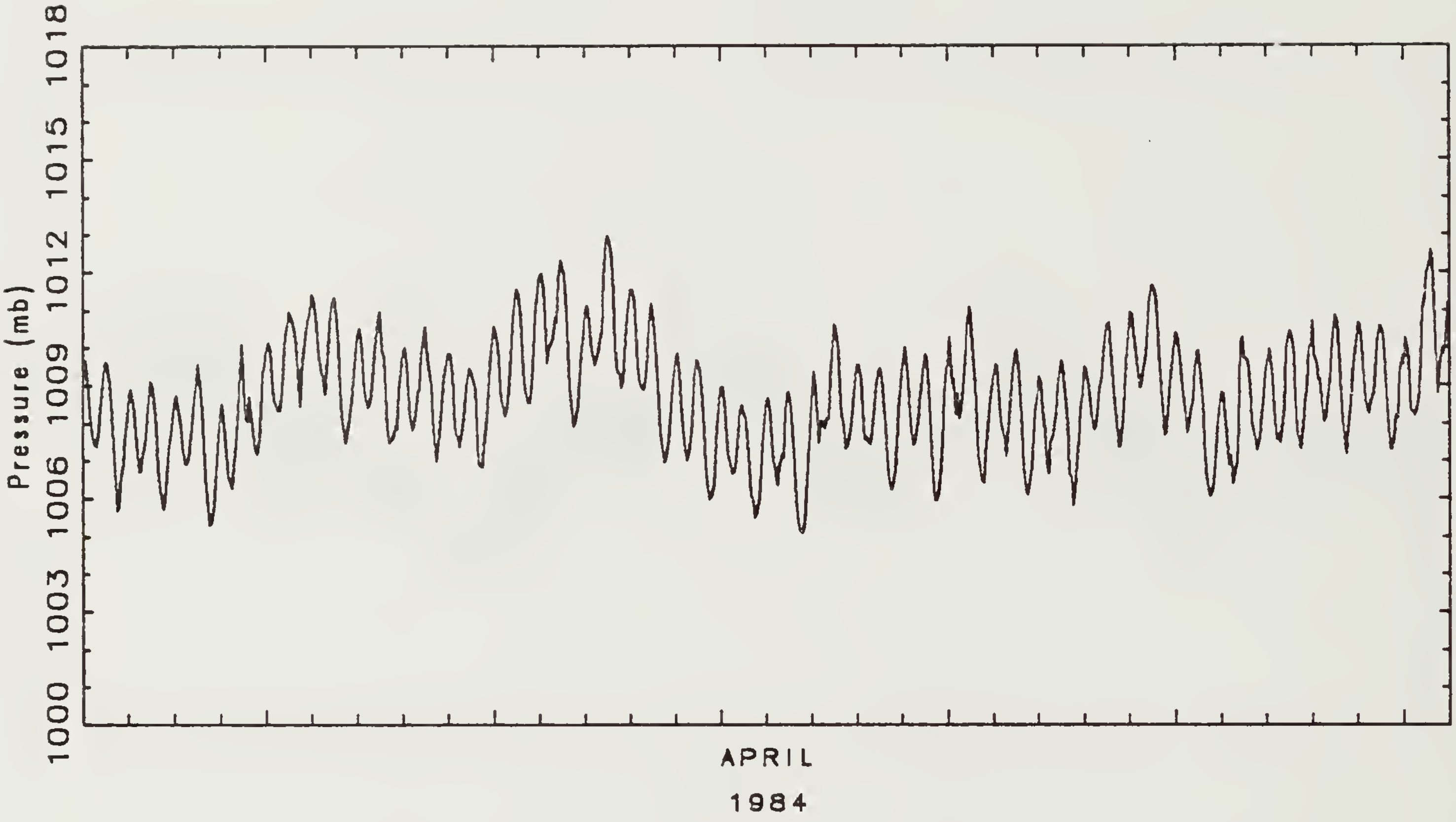

Velocity (m/sec)
0
2
4
6
8
10
12
MARCH
1984

March 1984

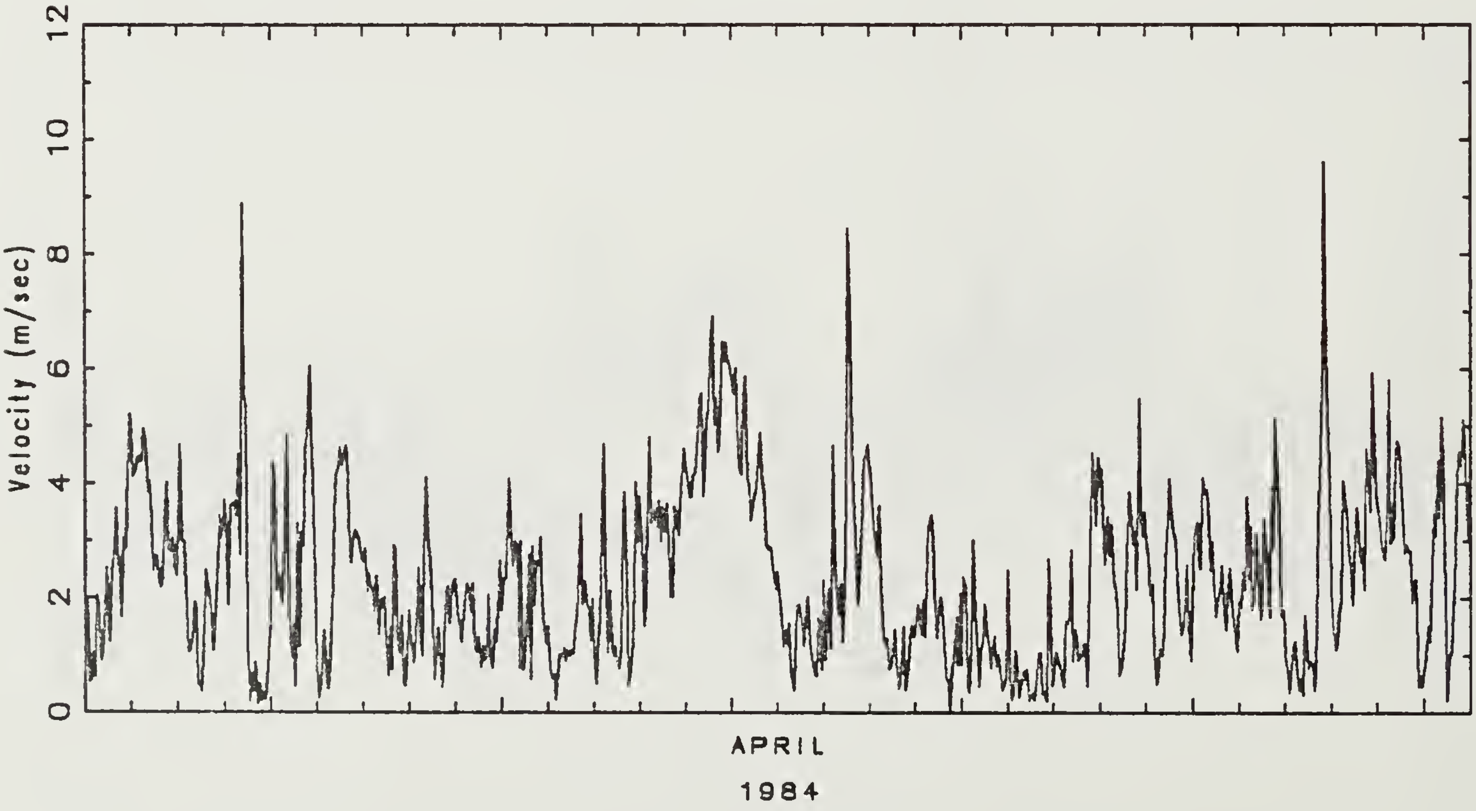

North / South Component (m/sec)
9
6
3
0
-3
-6
-9
MARCH
1984


East / West Component (m/sec)
9
6
3
0
-3
-6
-9
-12
MARCH
1984

April 1984

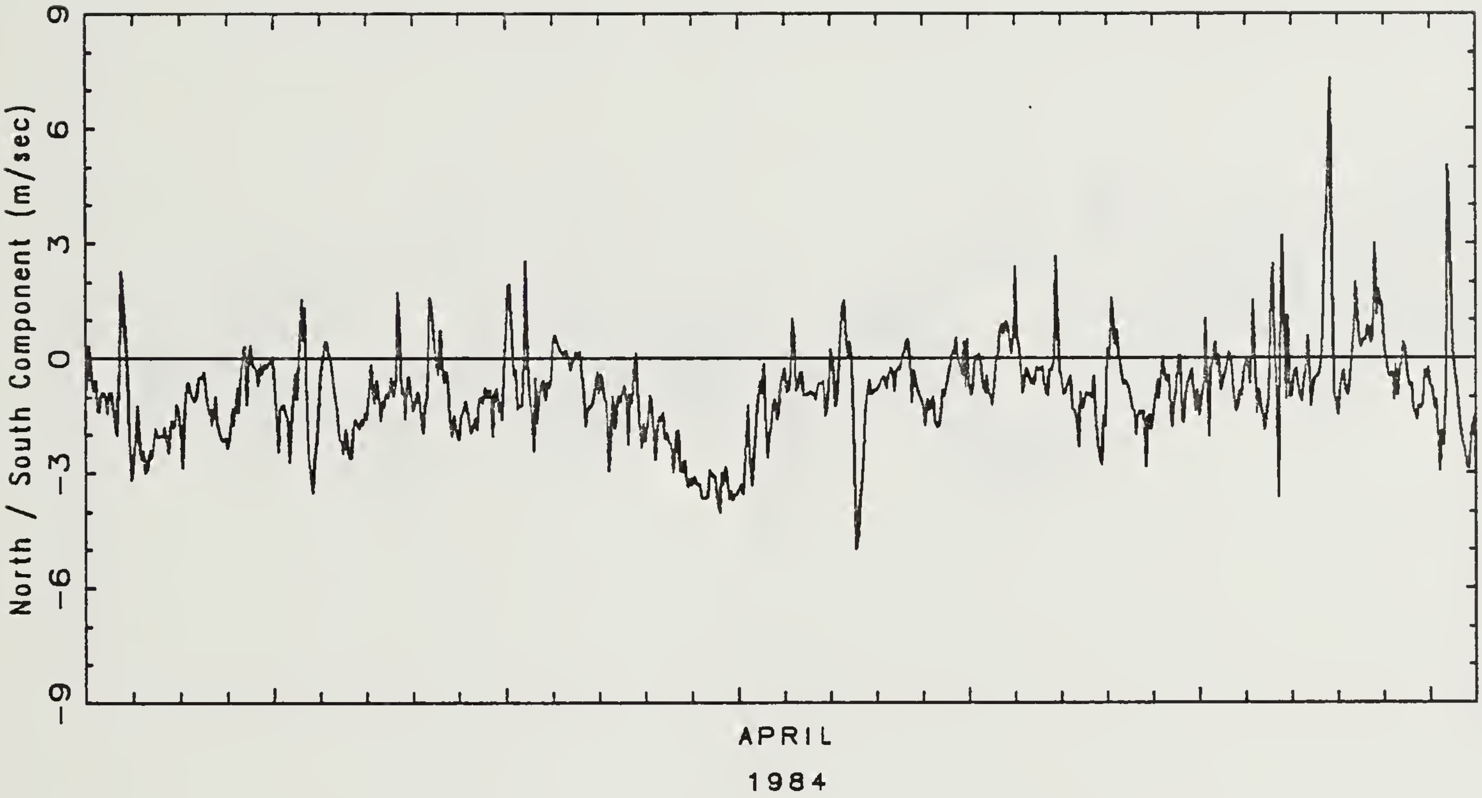


Pressure (mb)
1000
1003
1006
1009
1012
1015
1018
APRIL
1984

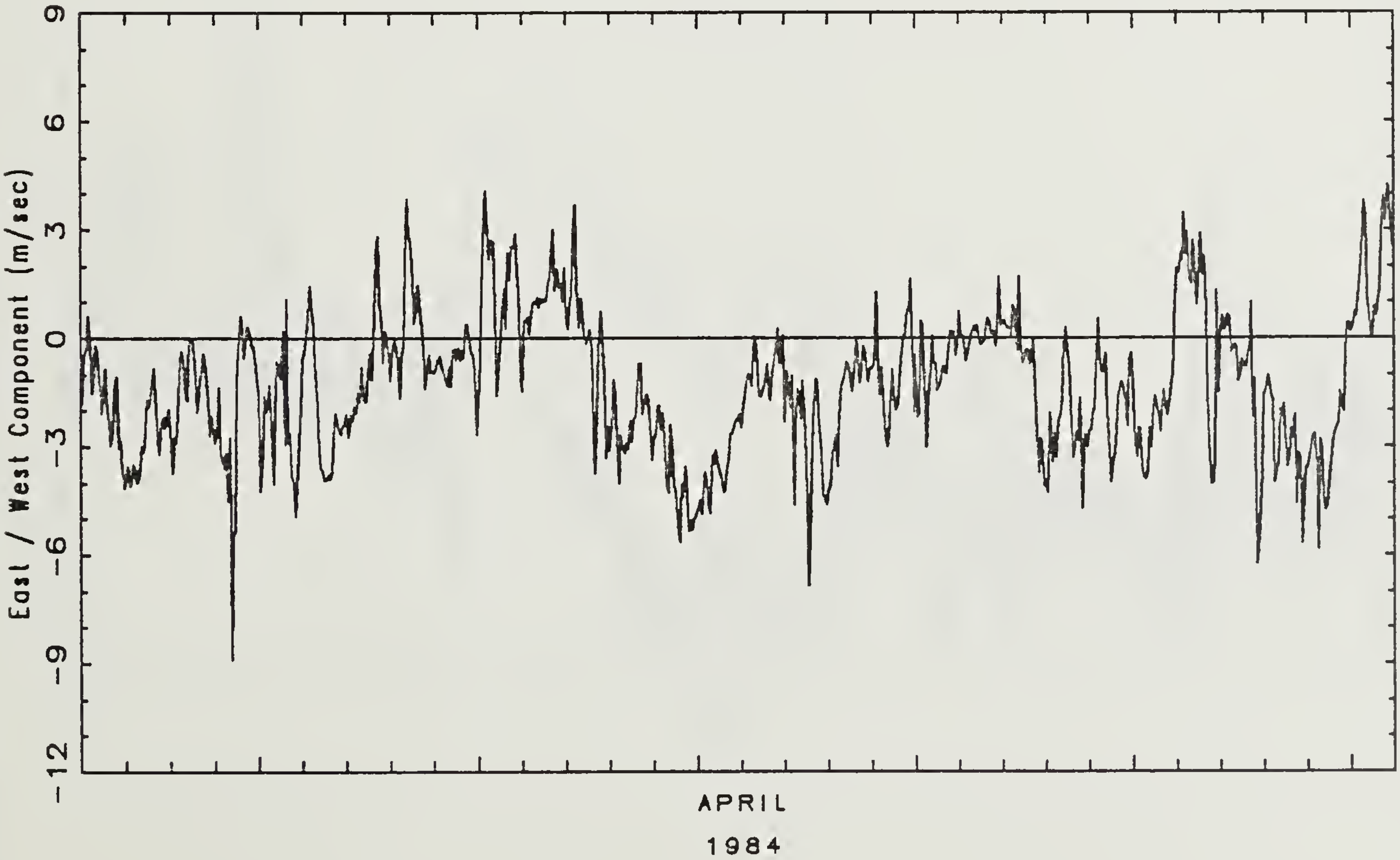


Velocity (m/sec)
0
2
4
6
8
10
12
APRIL
1984

April 1984

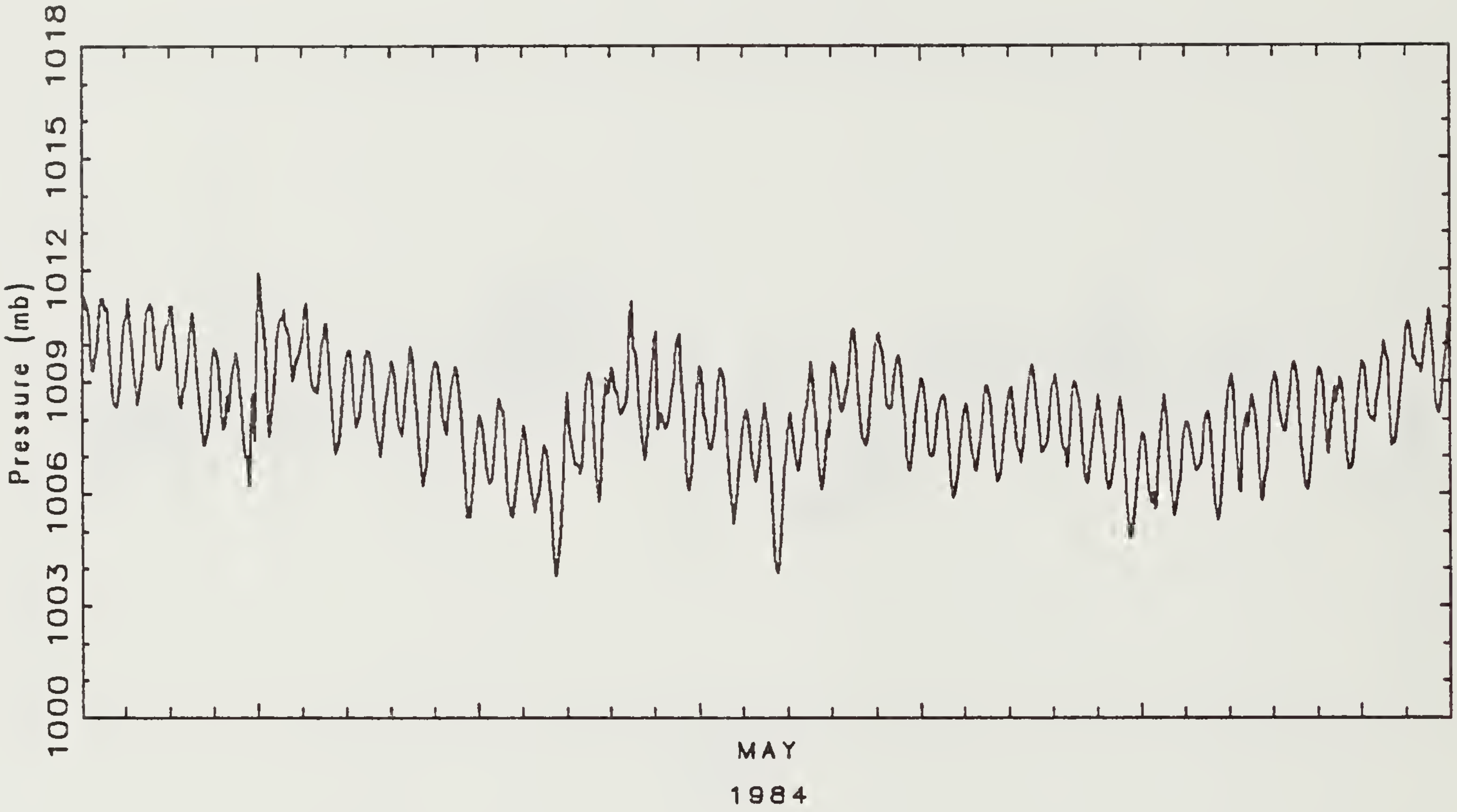


9
6
3
0
-3
-6
-9
North / South Component (m/sec)
APRIL
1984



9
6
3
0
-3
-6
-9
-12
East / West Component (m/sec)
APRIL
1984

May 1984


Pressure (mb)
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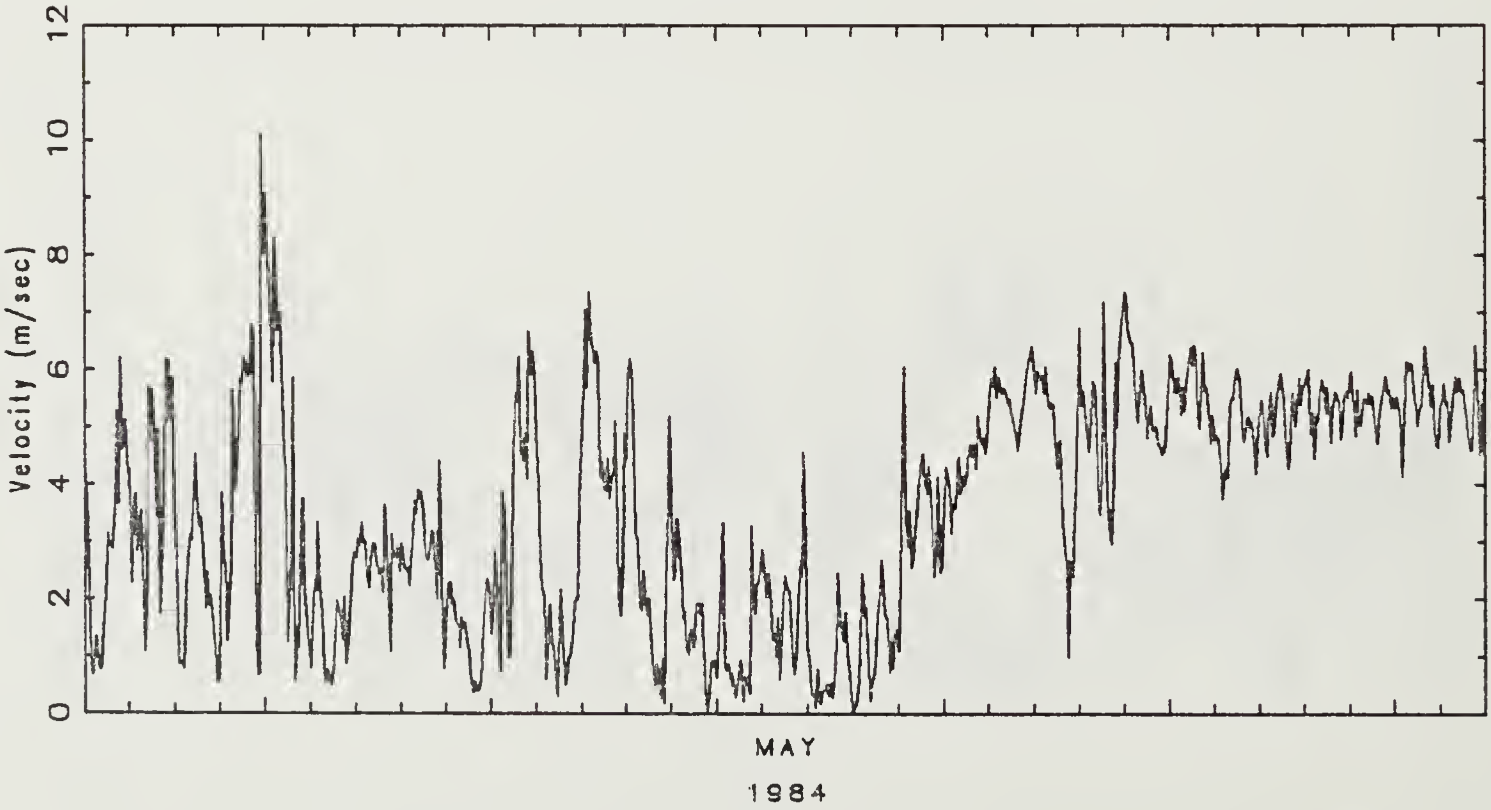
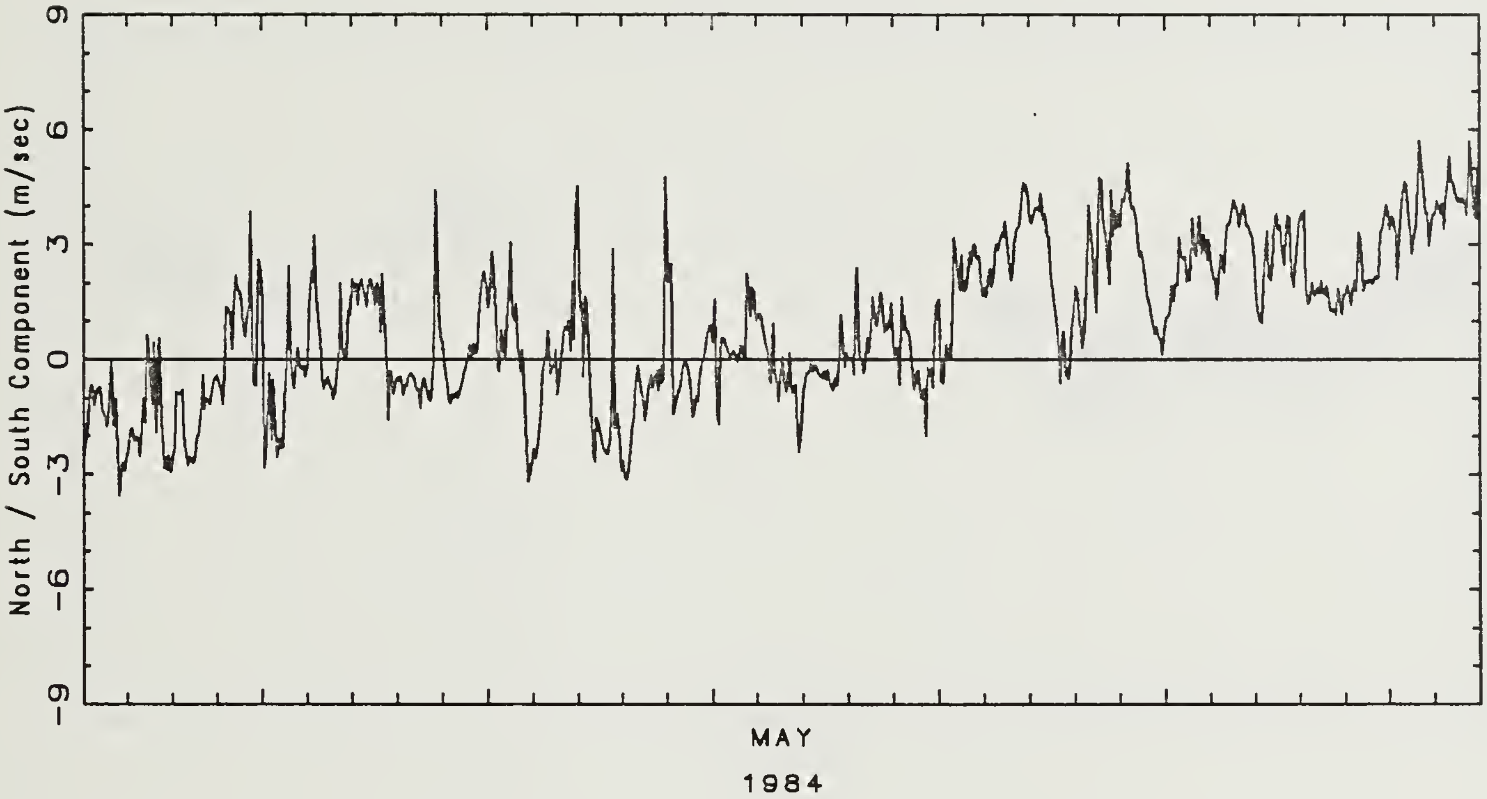
1003
1006
1009
1012
1015
1018
MAY
1984


Velocity (m/sec)
0
2
4
6
8
10
12
MAY
1984

May 1984


North / South Component (m/sec)
9
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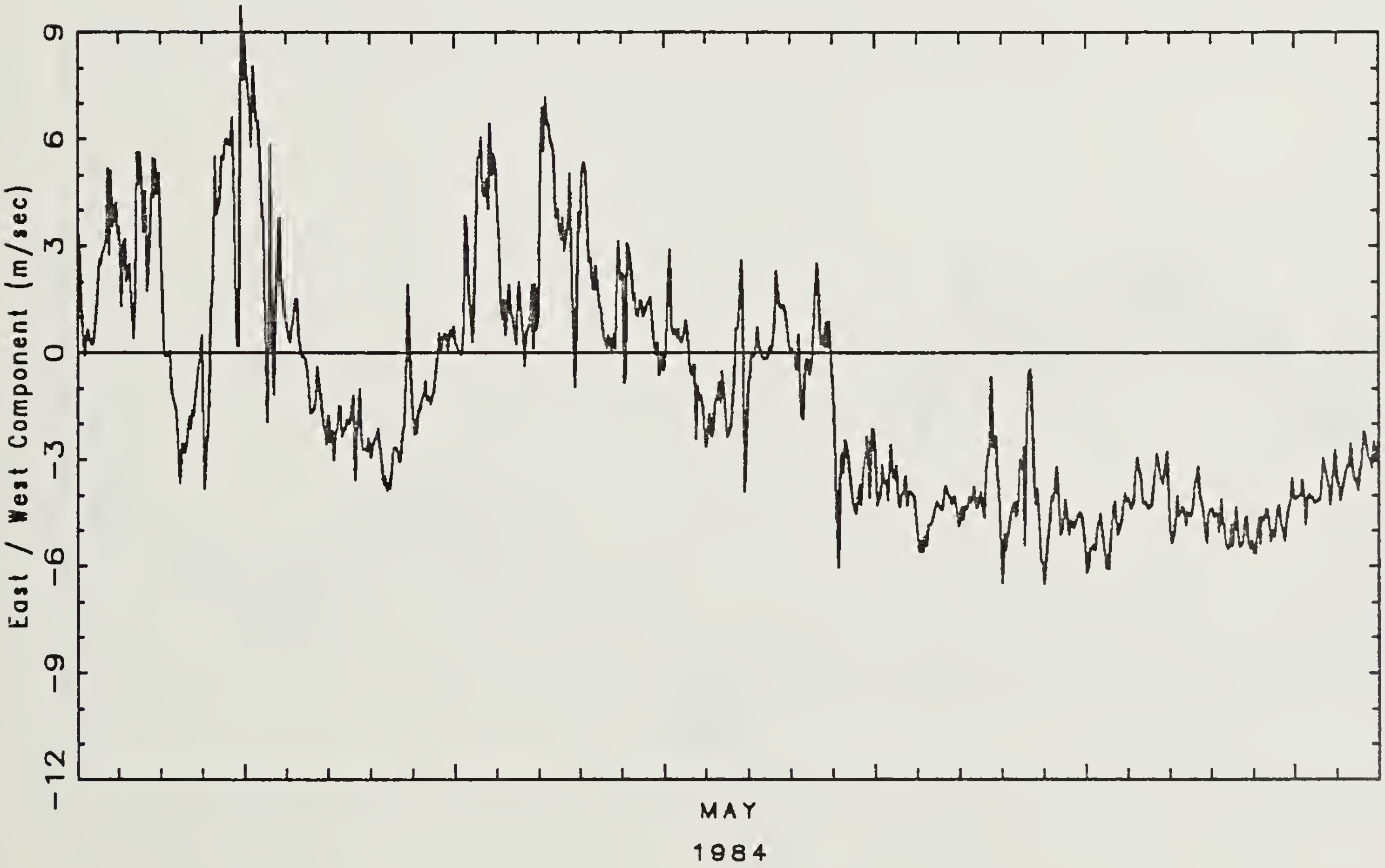
3
0
-3
-6
-9
MAY
1984


East / West Component (m/sec)
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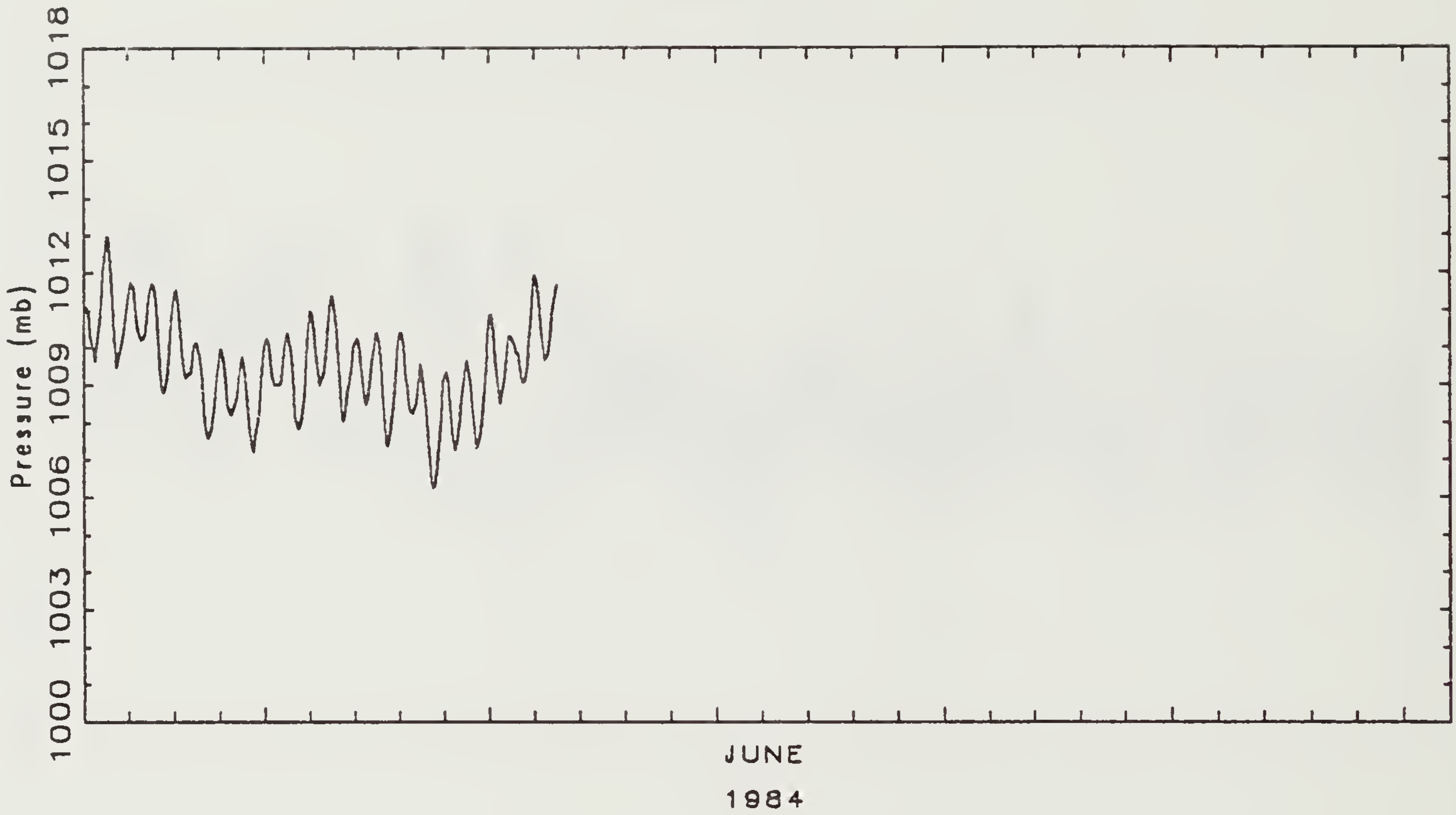
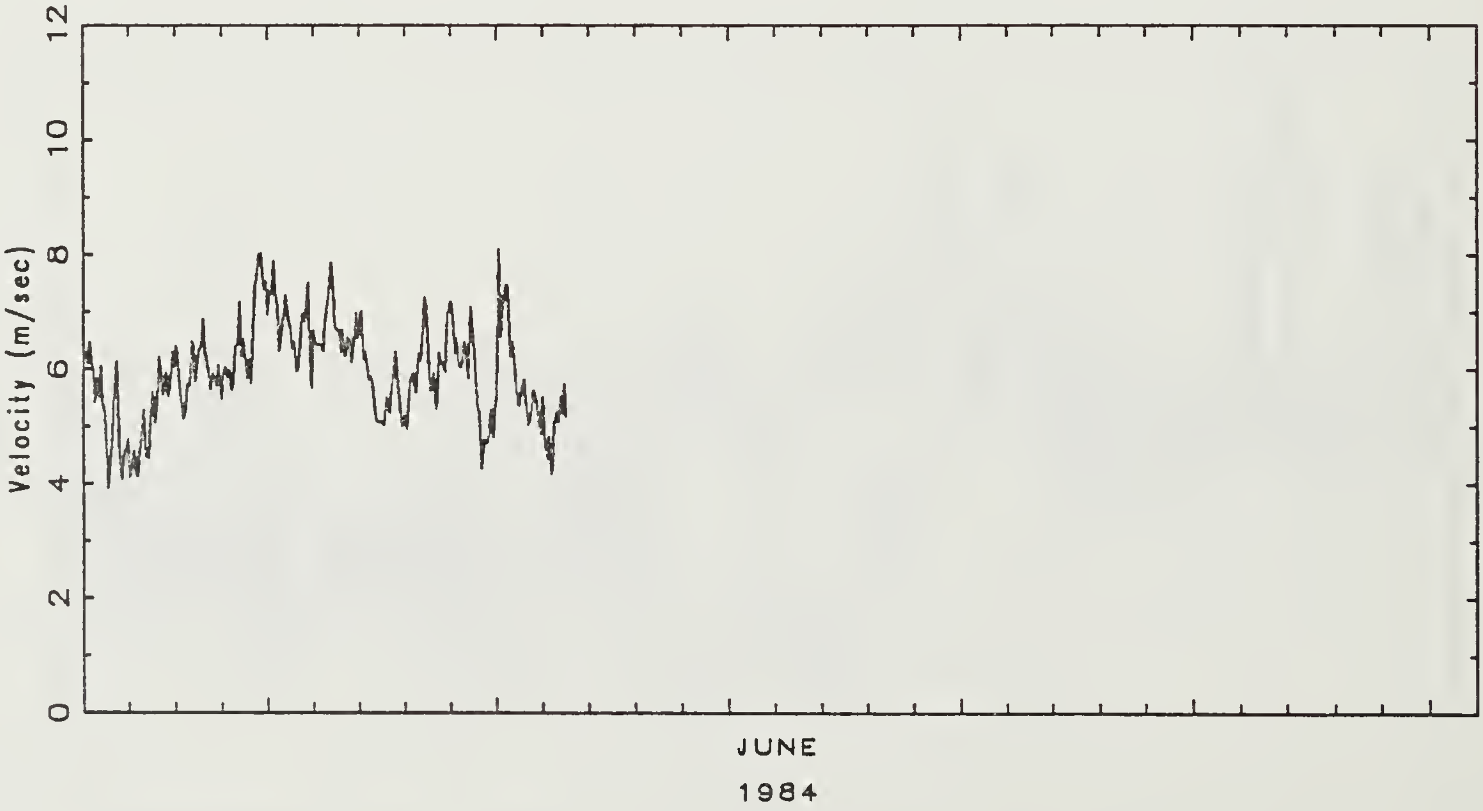
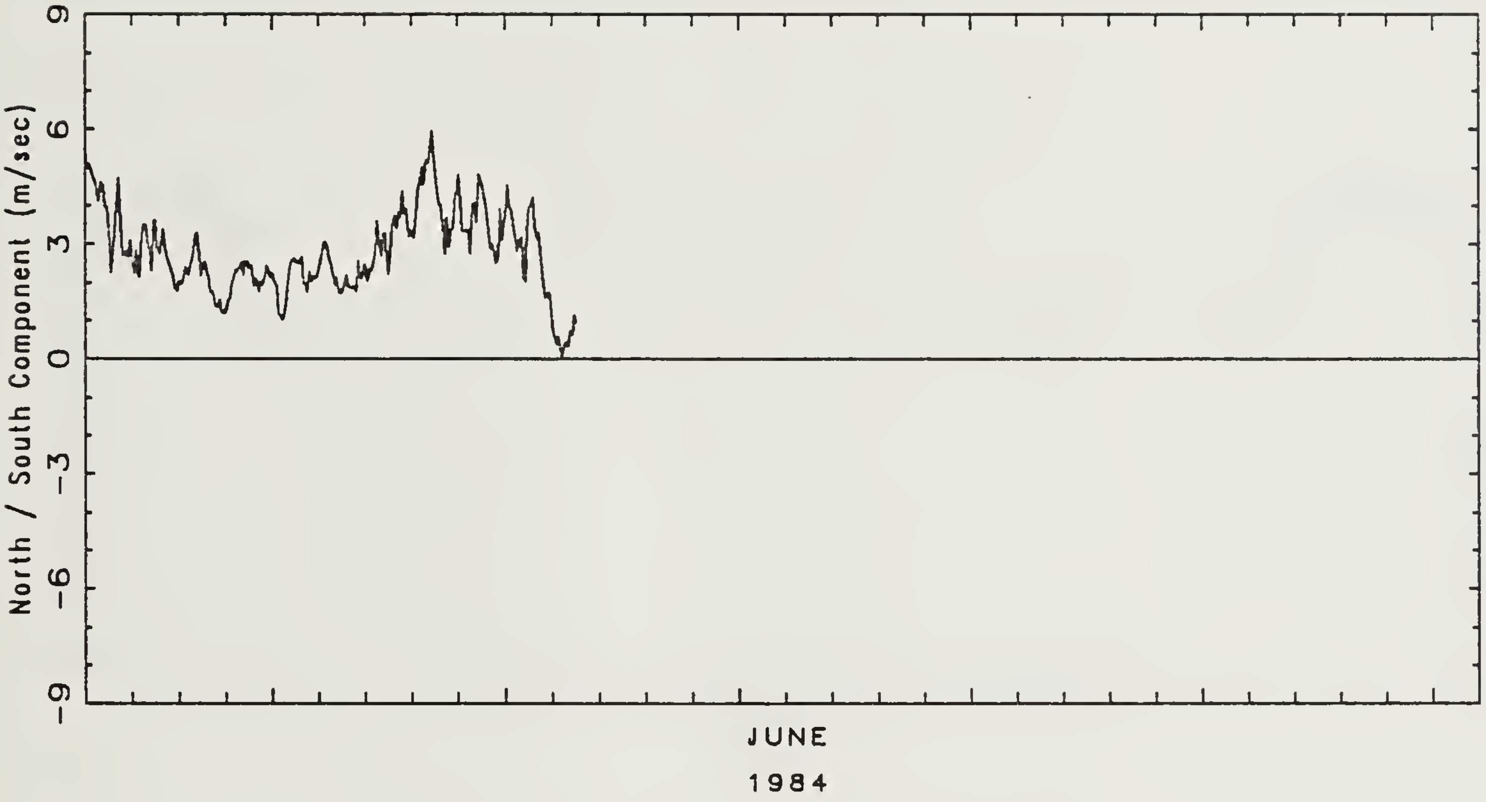
3
0
-3
-6
-9
-12
MAY
1984

June 1984


Pressure (mb)
1018
1015
1012
1009
1006
1003
1000
JUNE
1984


Velocity (m/sec)
12
10
8
6
4
2
0
JUNE
1984

June 1984


9
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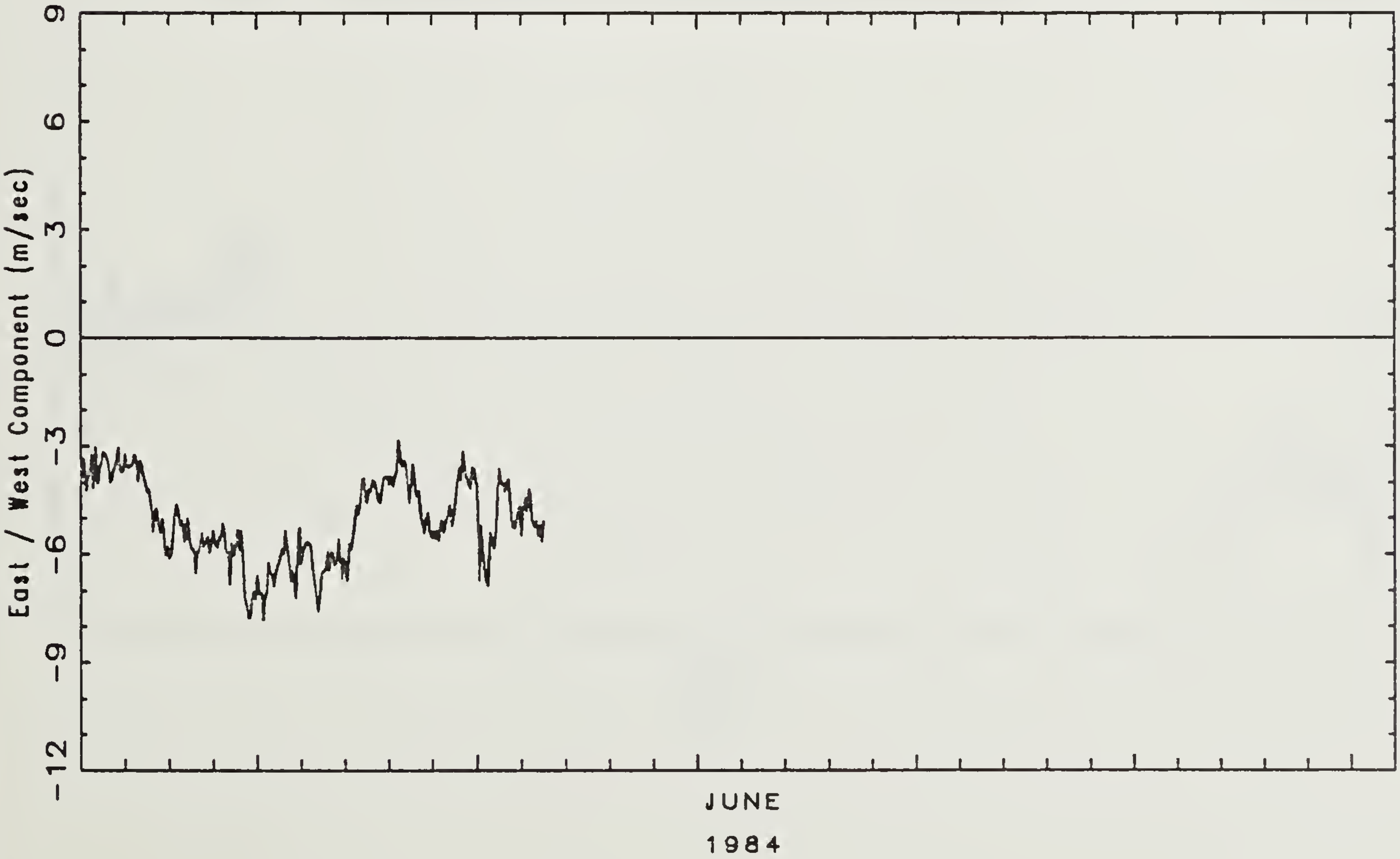
0
-3
-6
-9
North / South Component (m/sec)
JUNE
1984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3
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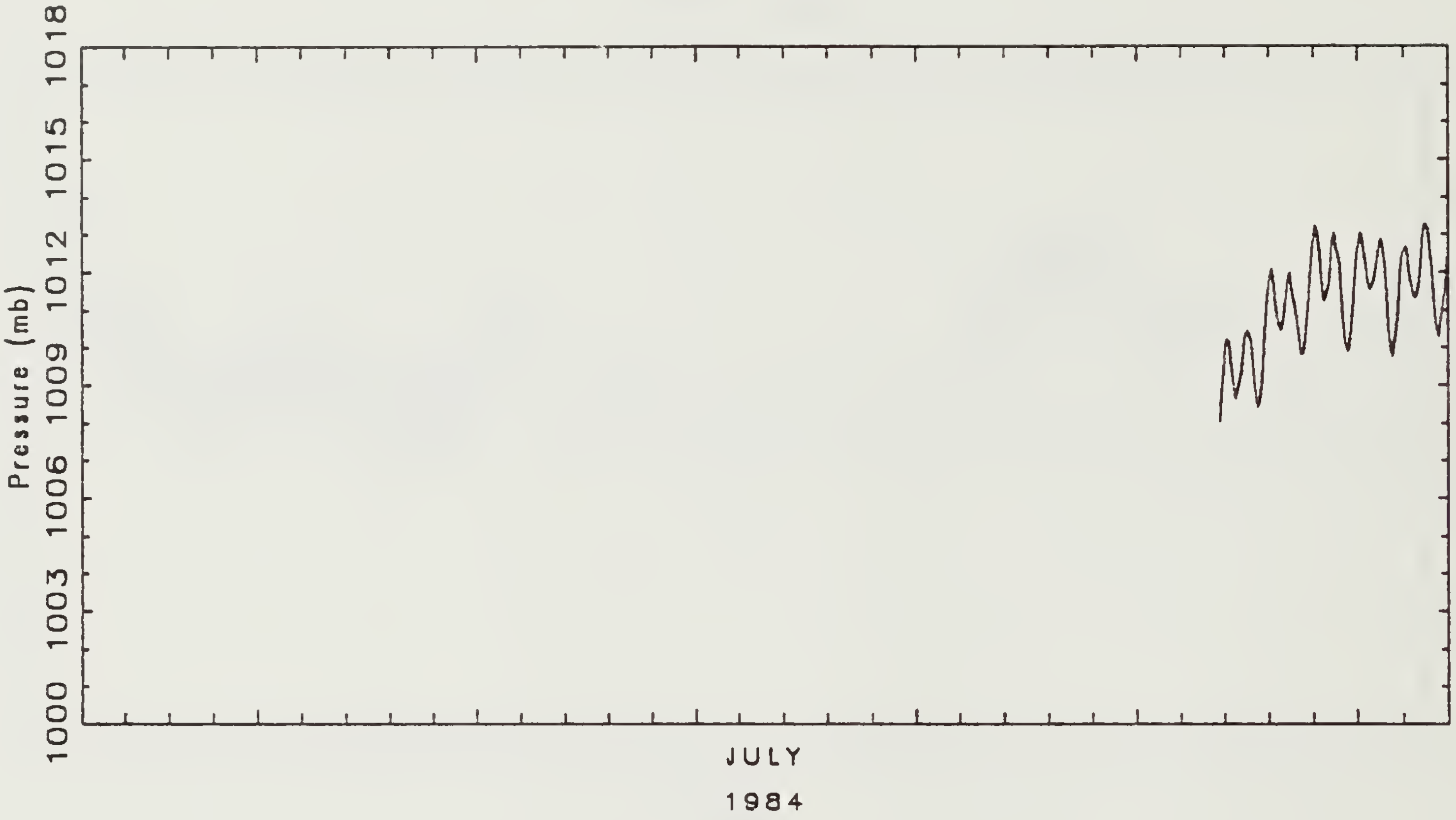
-3
-6
-9
-12
East / West Component (m/sec)
JUNE
1984

July 1984


Pressure (mb)
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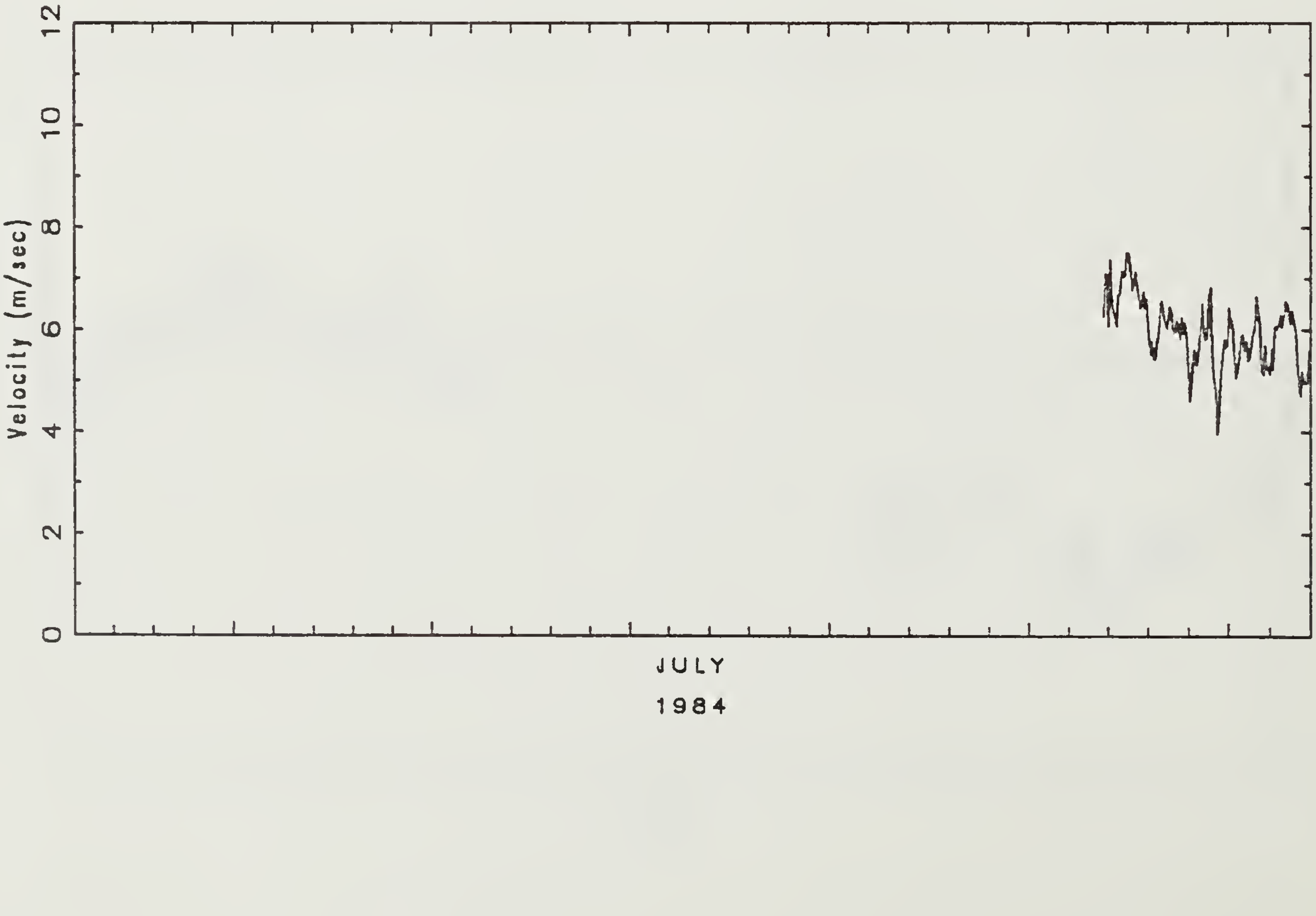
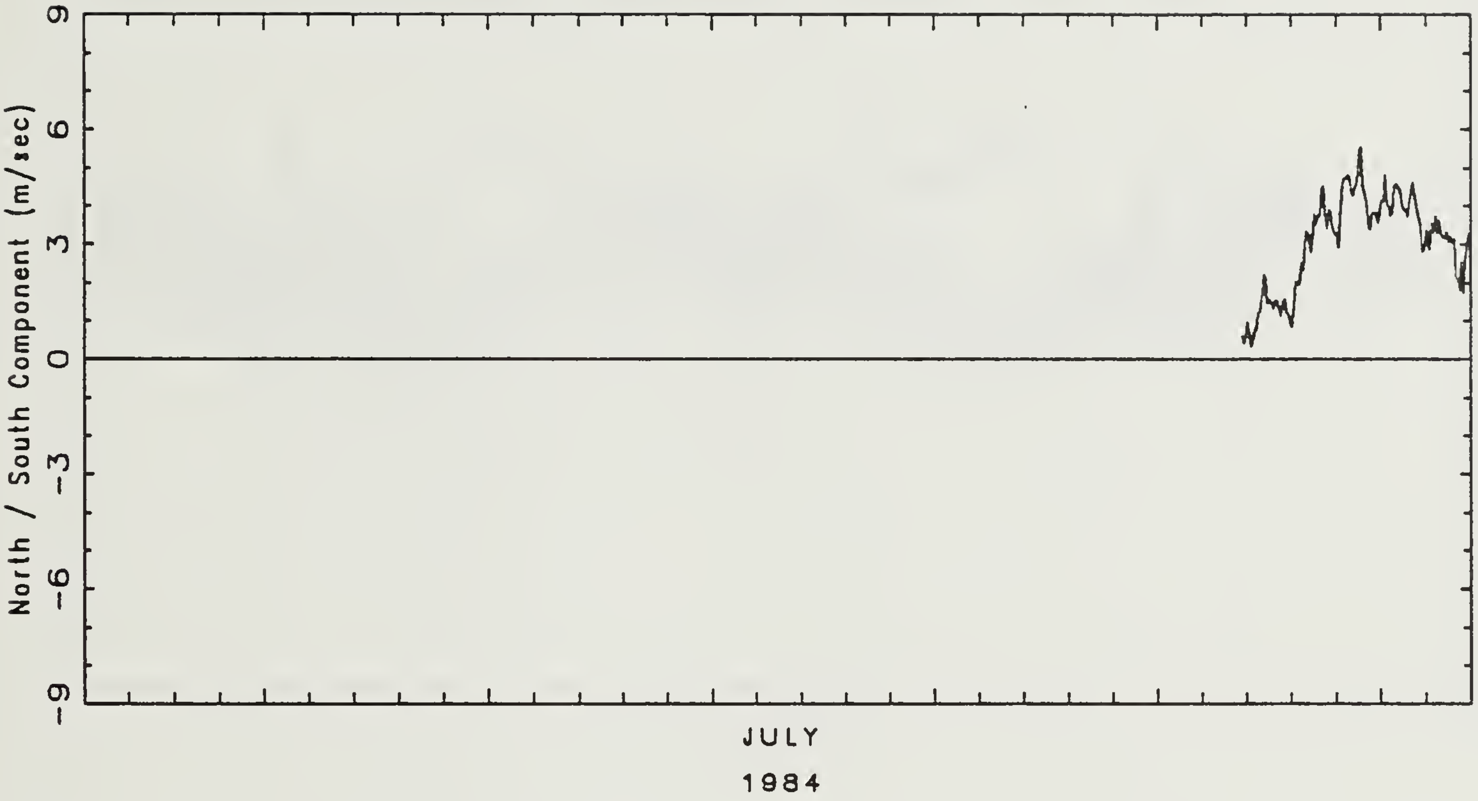
1006
1009
1012
1015
1018
JULY
1984


Velocity (m/sec)
0
2
4
6
8
10
12
JULY
1984

July 1984


North / South Component (m/sec)
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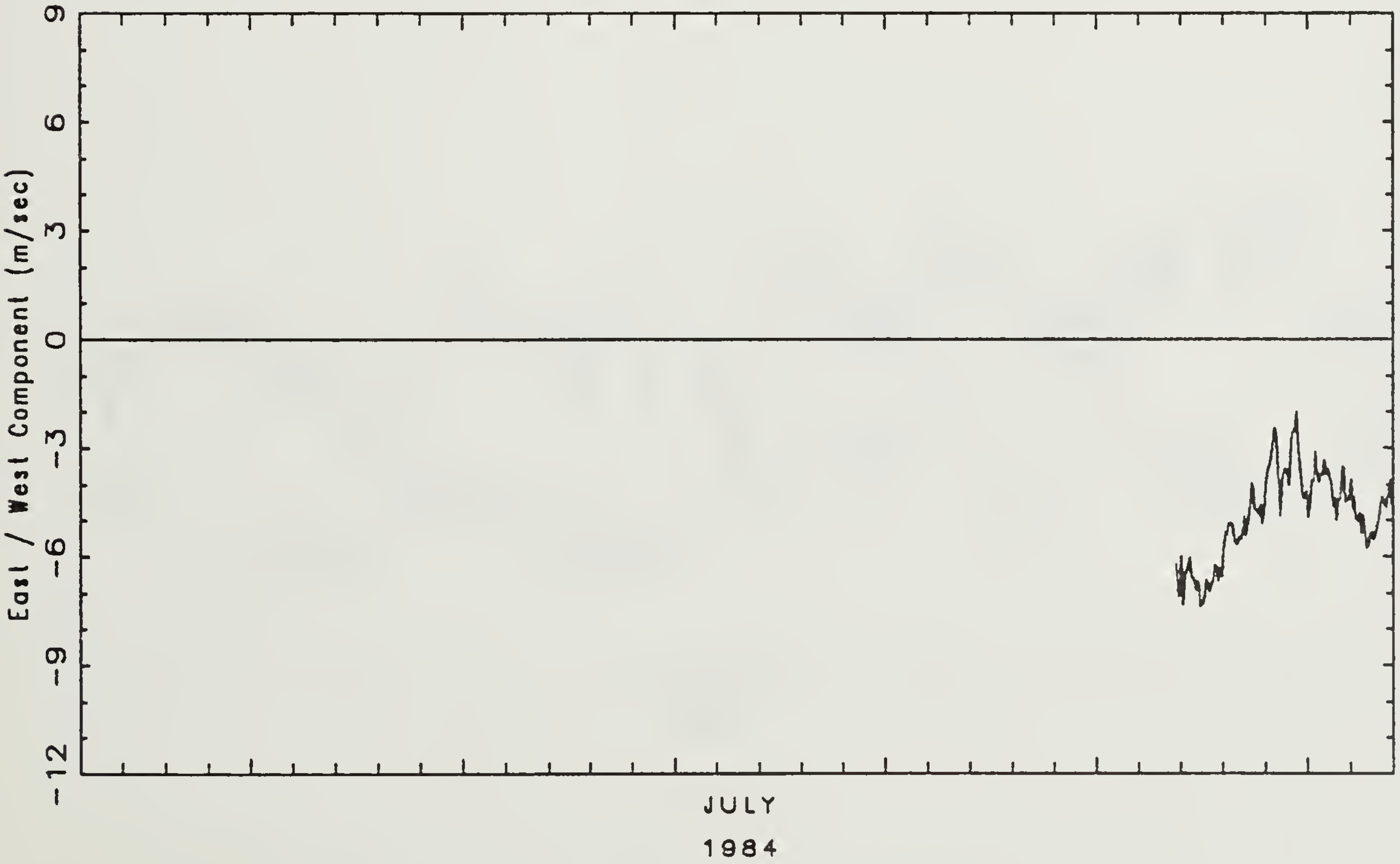
0
-3
-6
-9
JULY
1984


East / West Component (m/sec)
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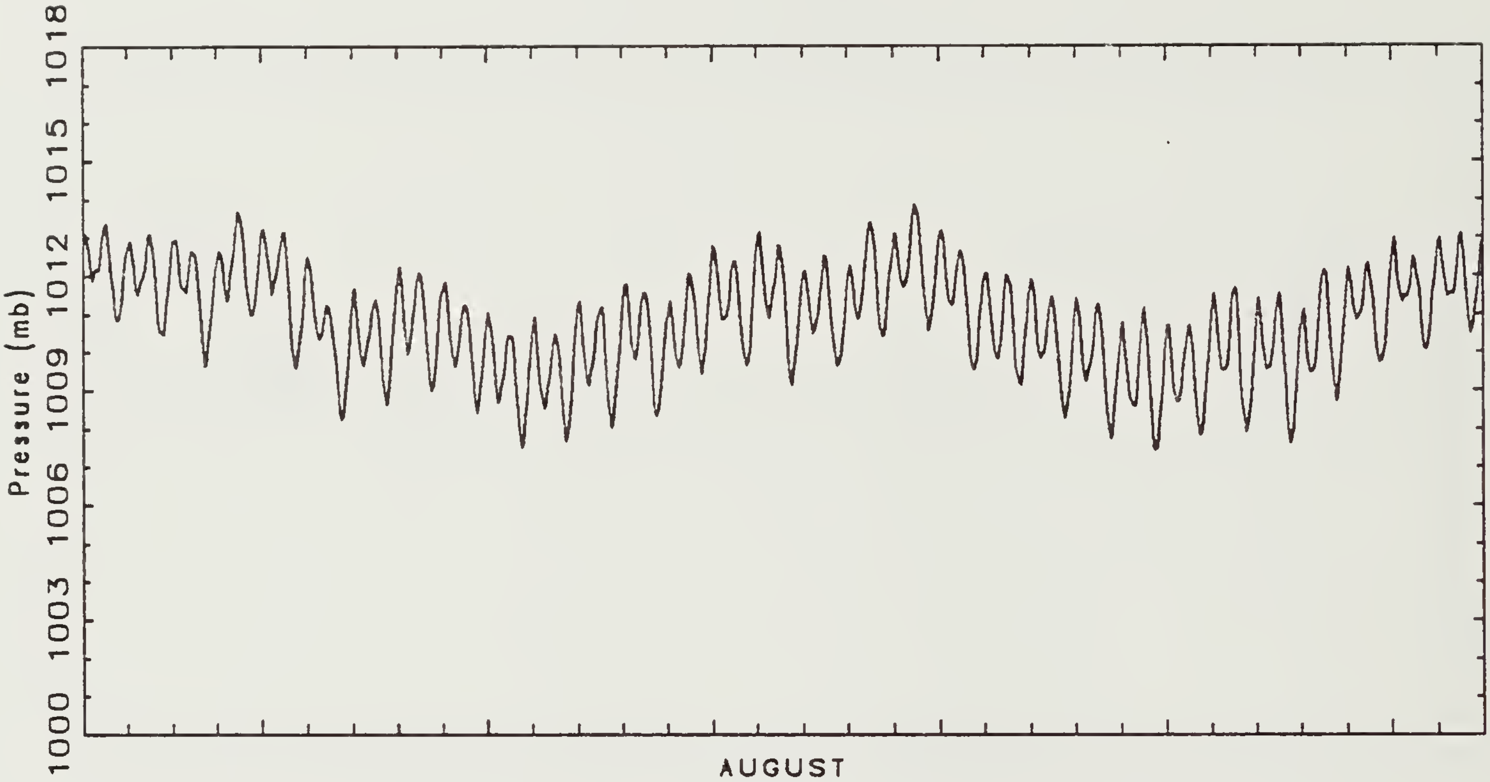
0
-3
-6
-9
-12
JULY
1984

August 1984



1018
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1003
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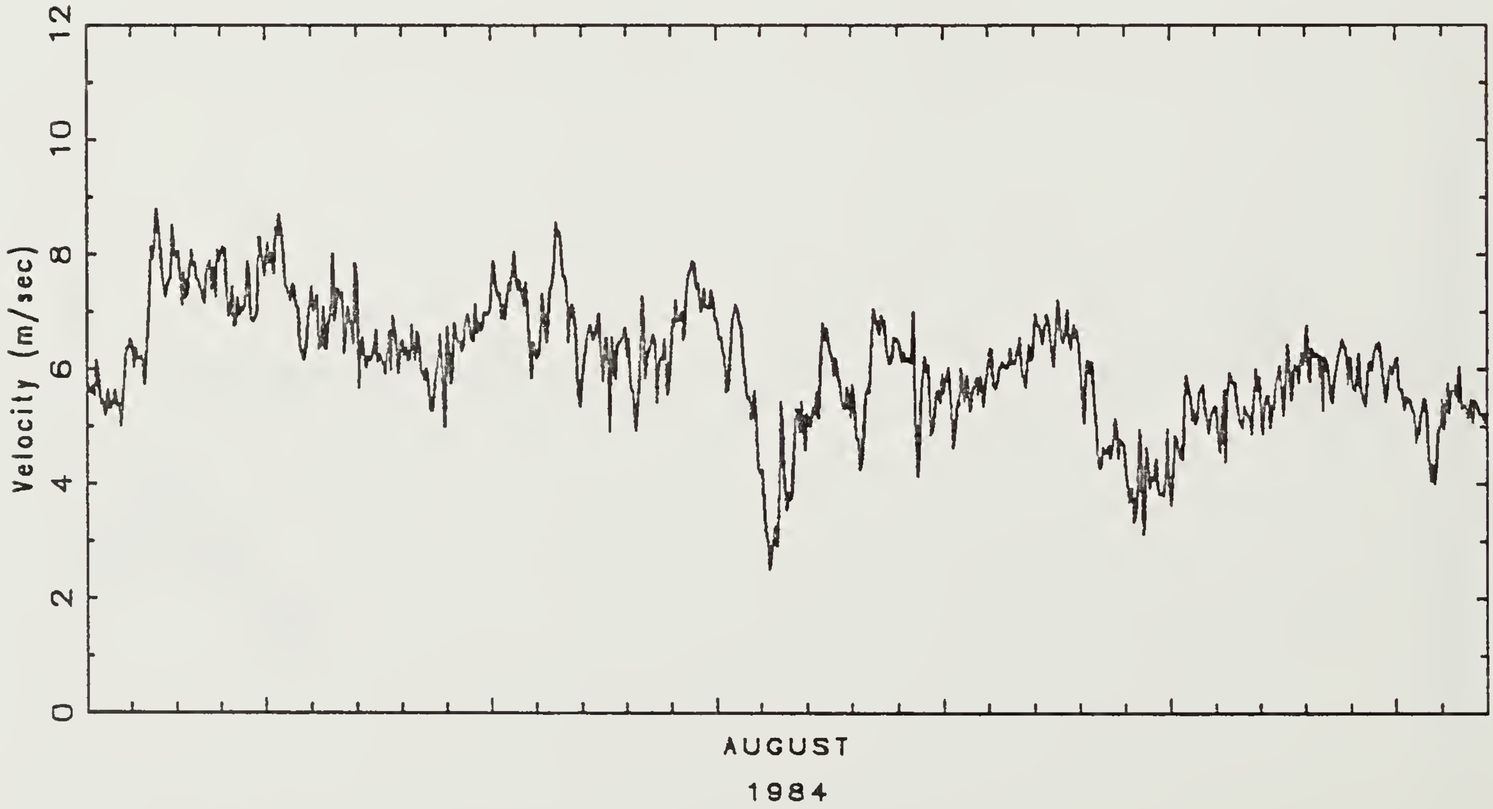
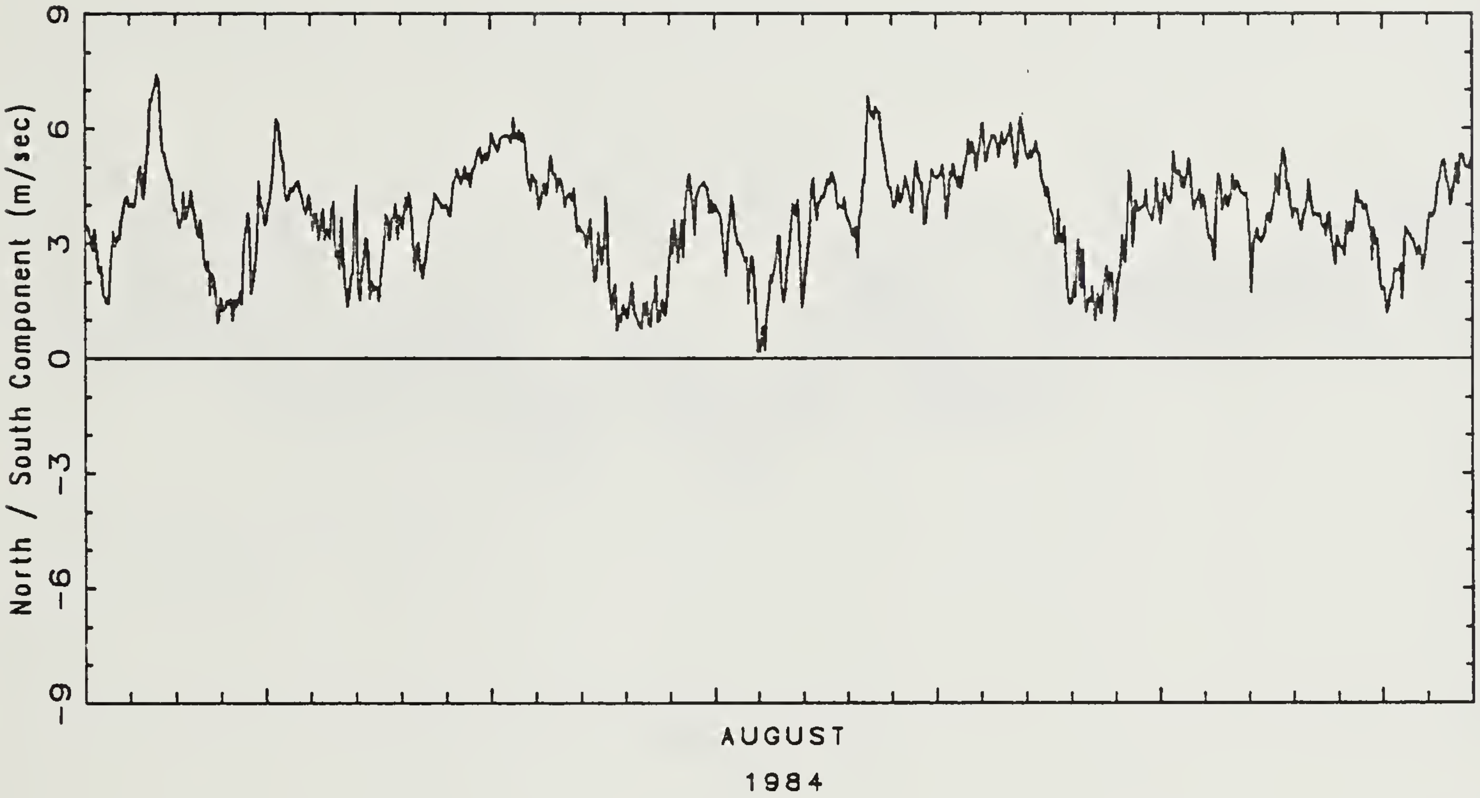
Pressure (mb)
AUGUST
1984



12
10
8
6
4
2
0
Velocity (m/sec)
AUGUST
1984

August 1984


9
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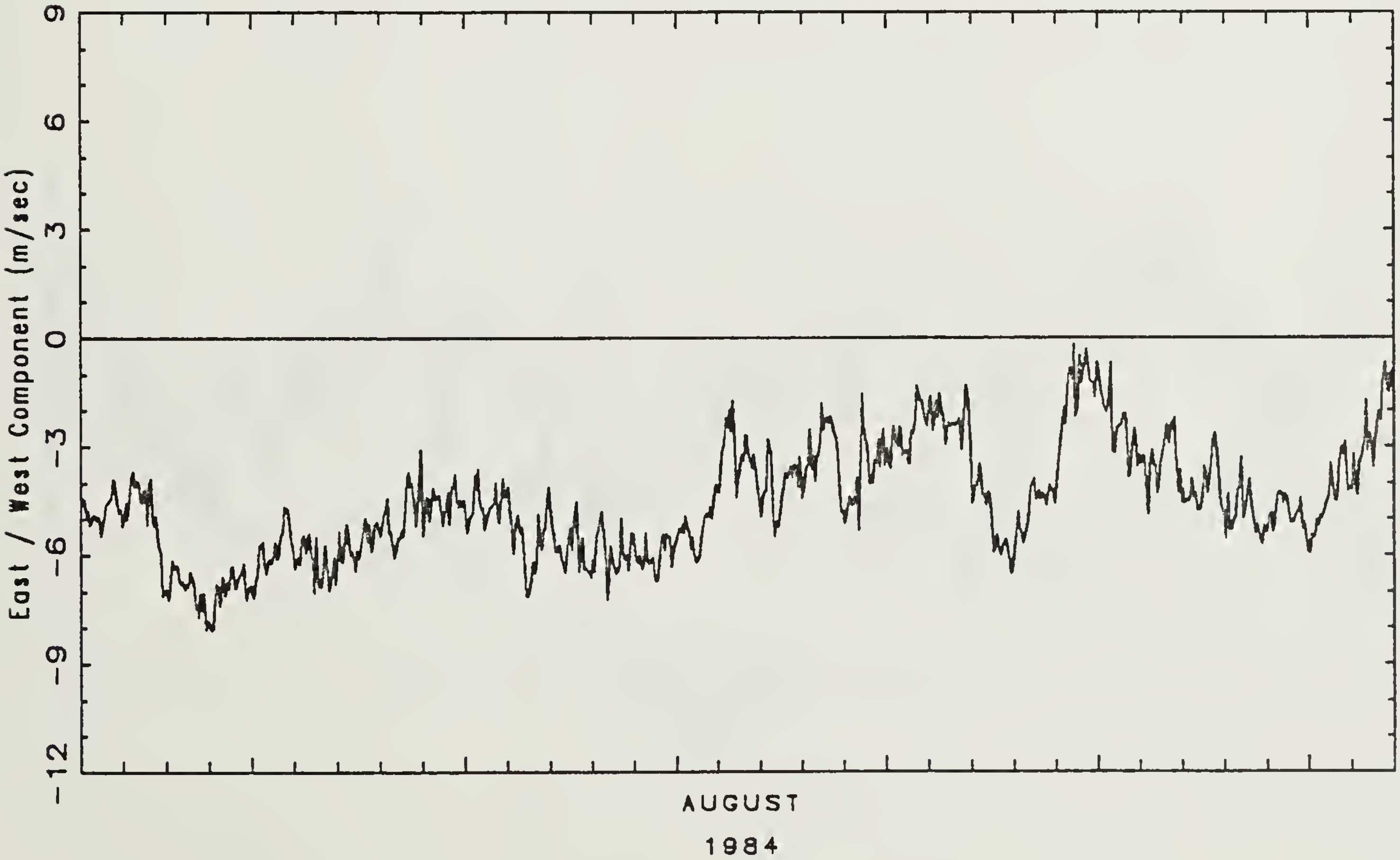
0
-3
-6
-9
North / South Component (m/sec)
AUGUST
1984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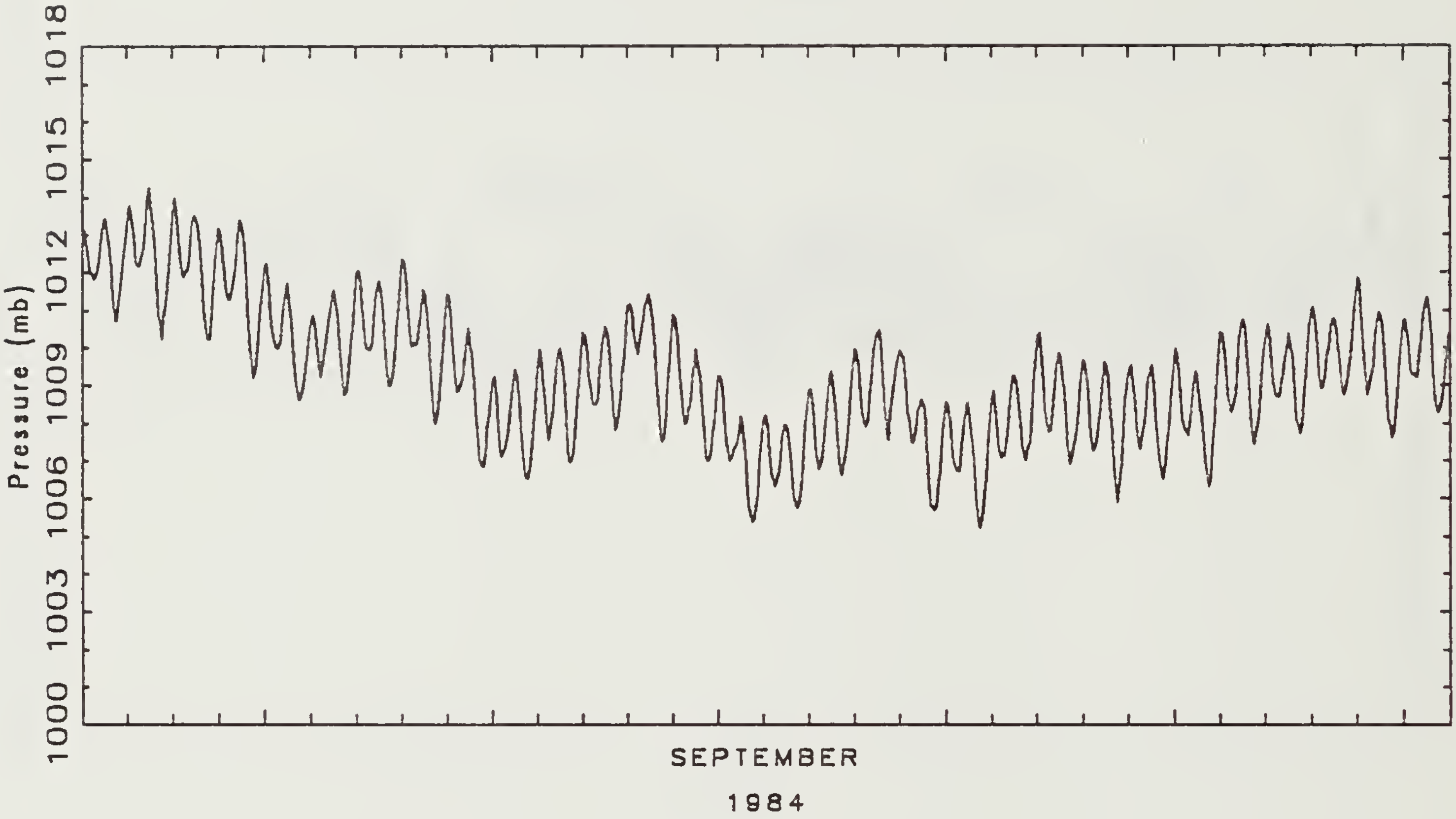
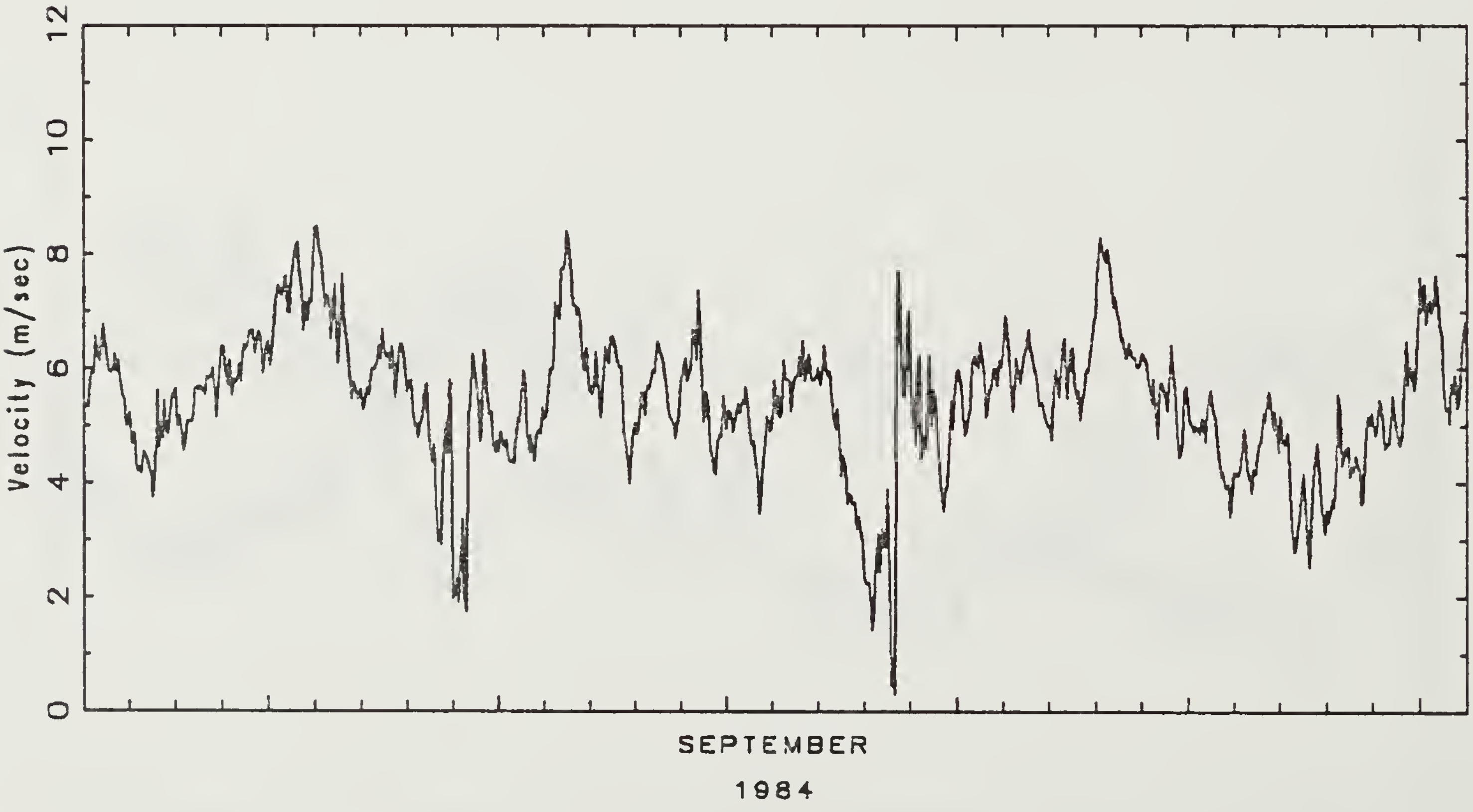
-12
East / West Component (m/sec)
AUGUST
1984

September 1984





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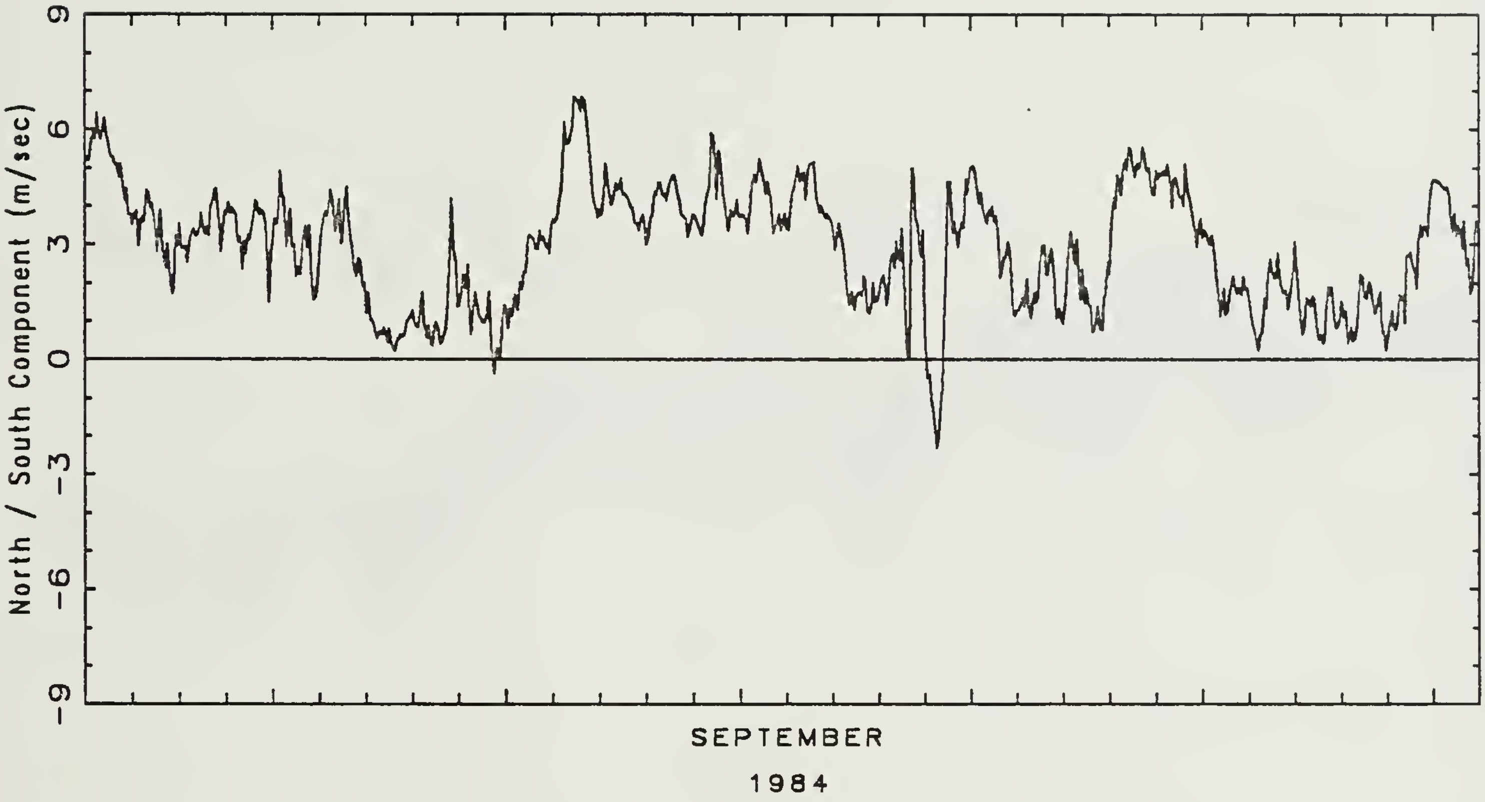

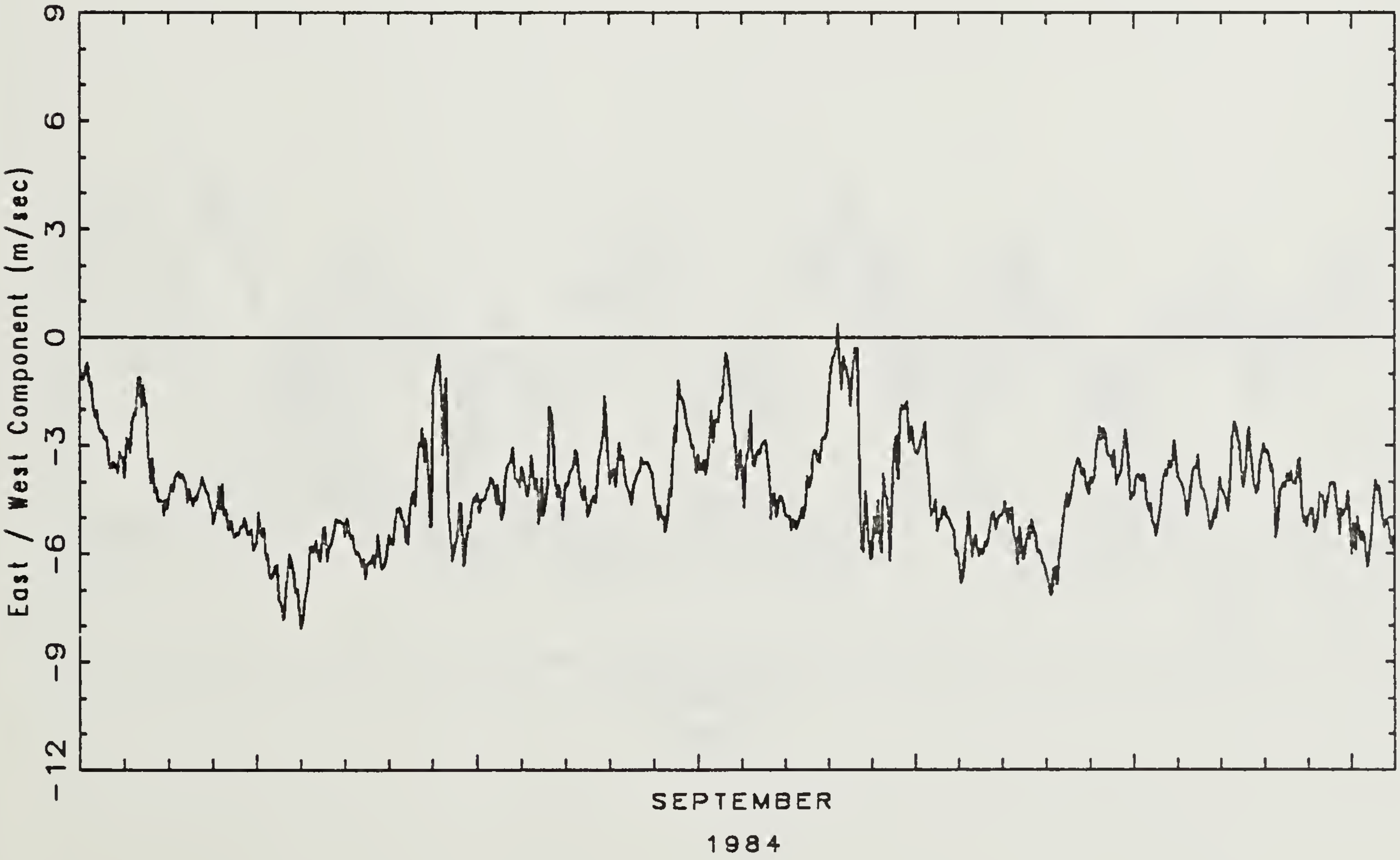

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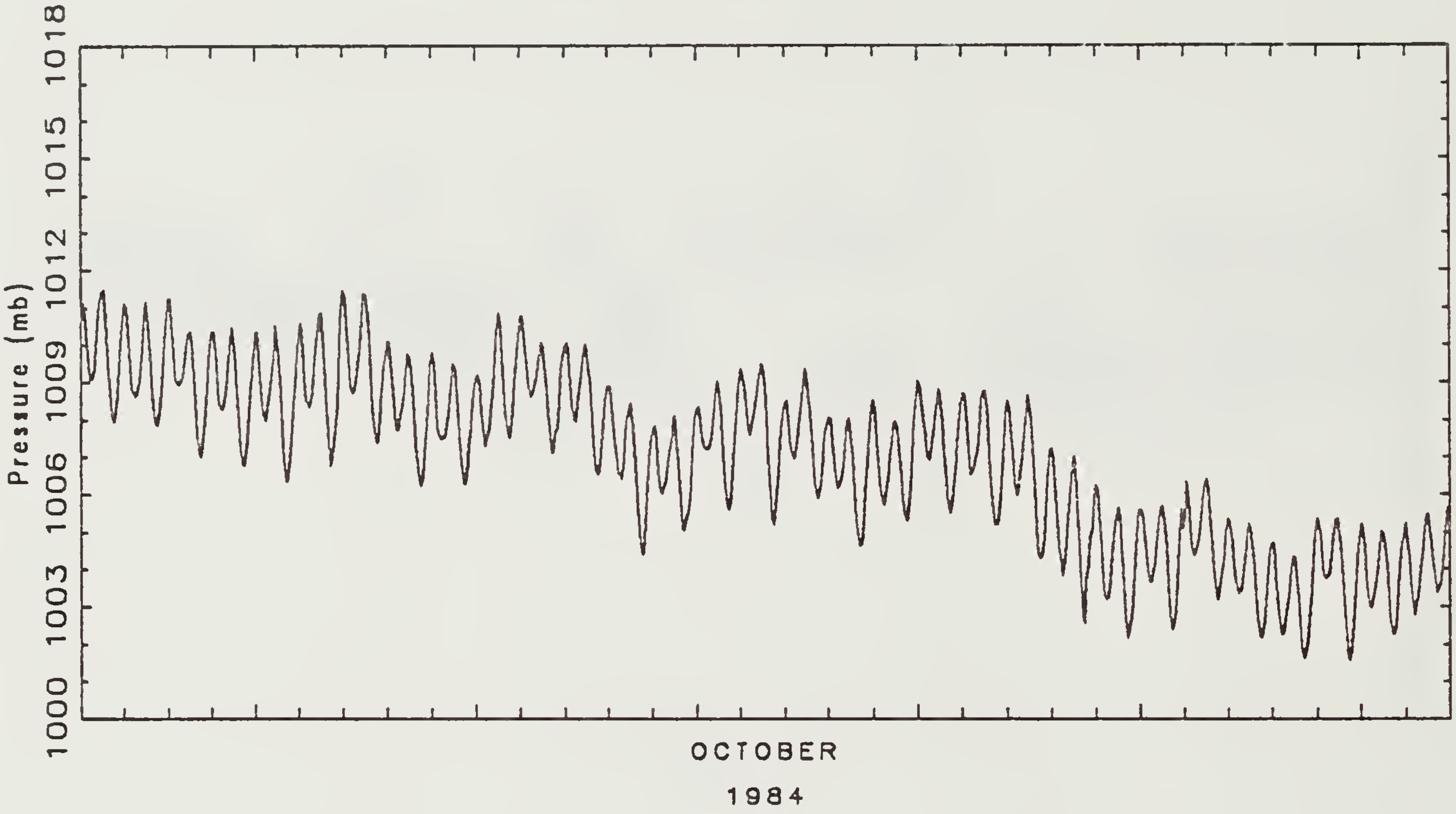

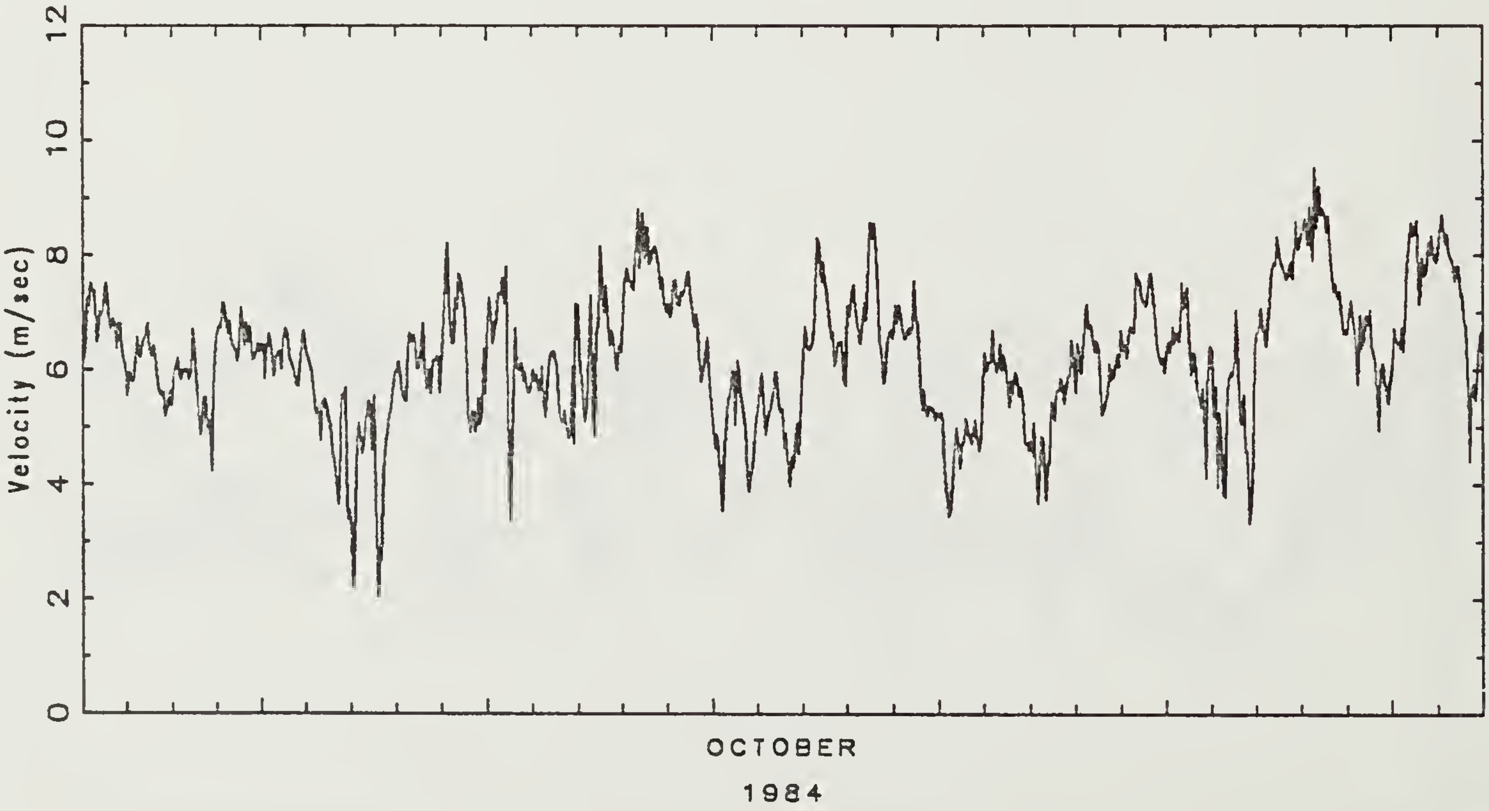

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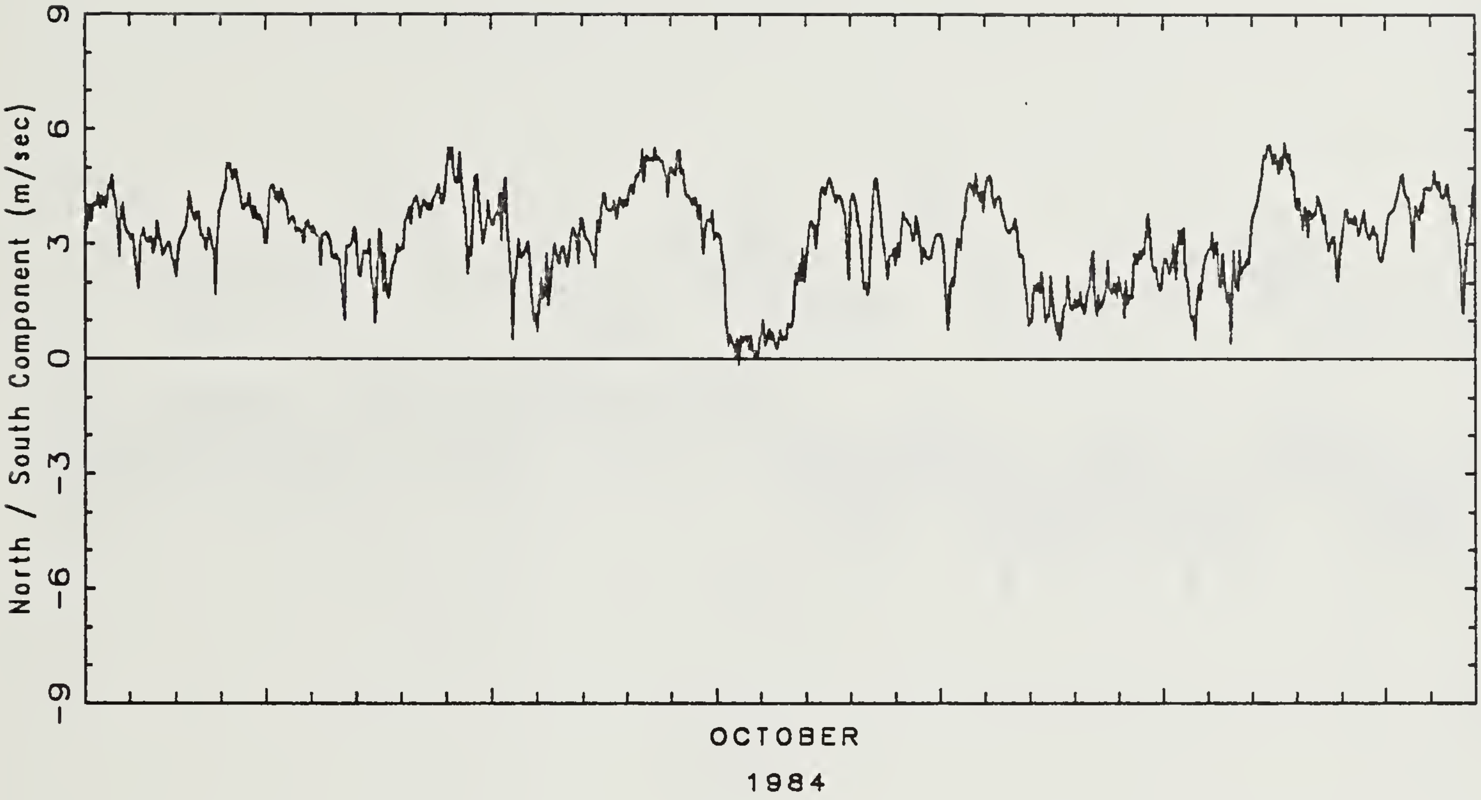

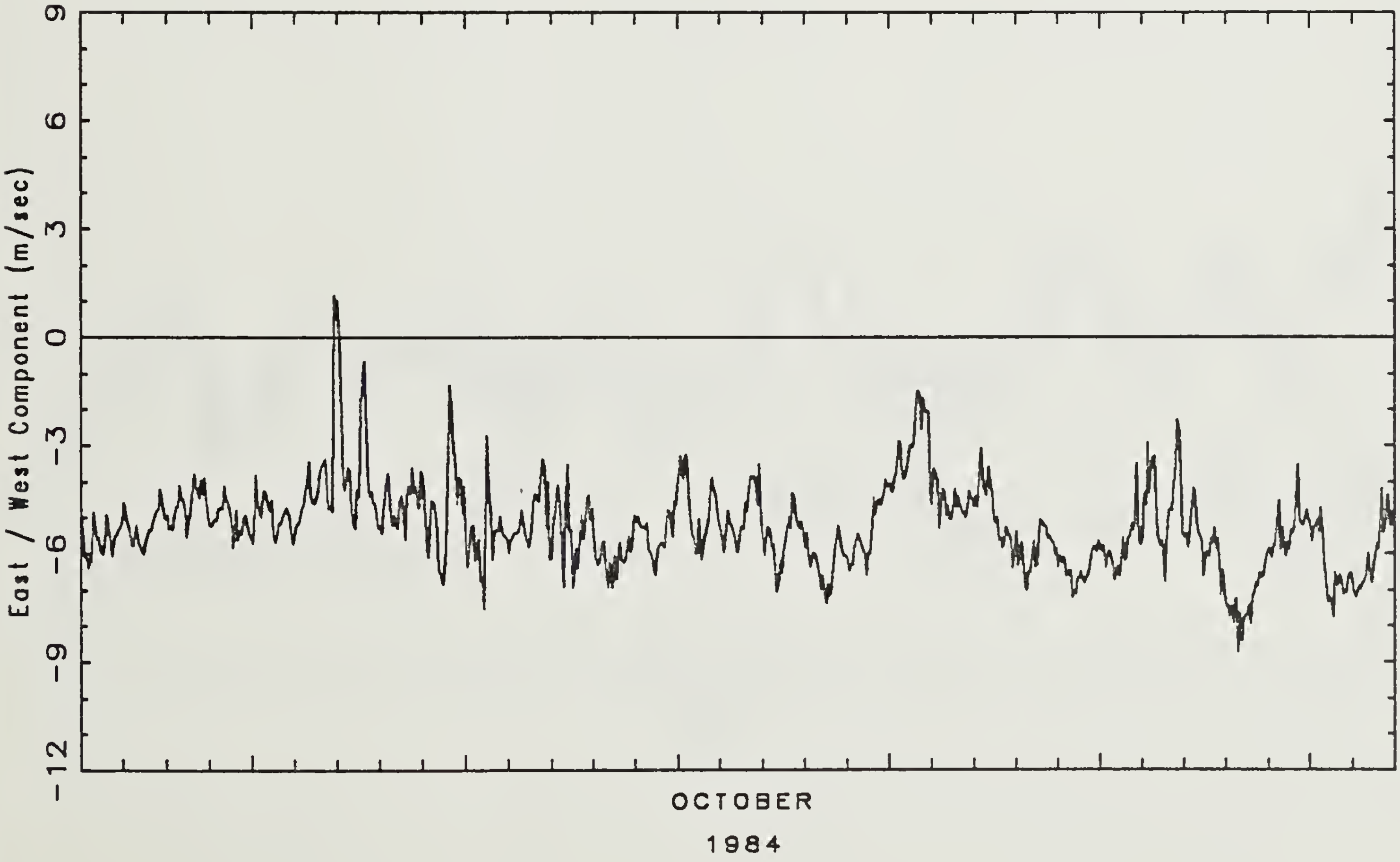

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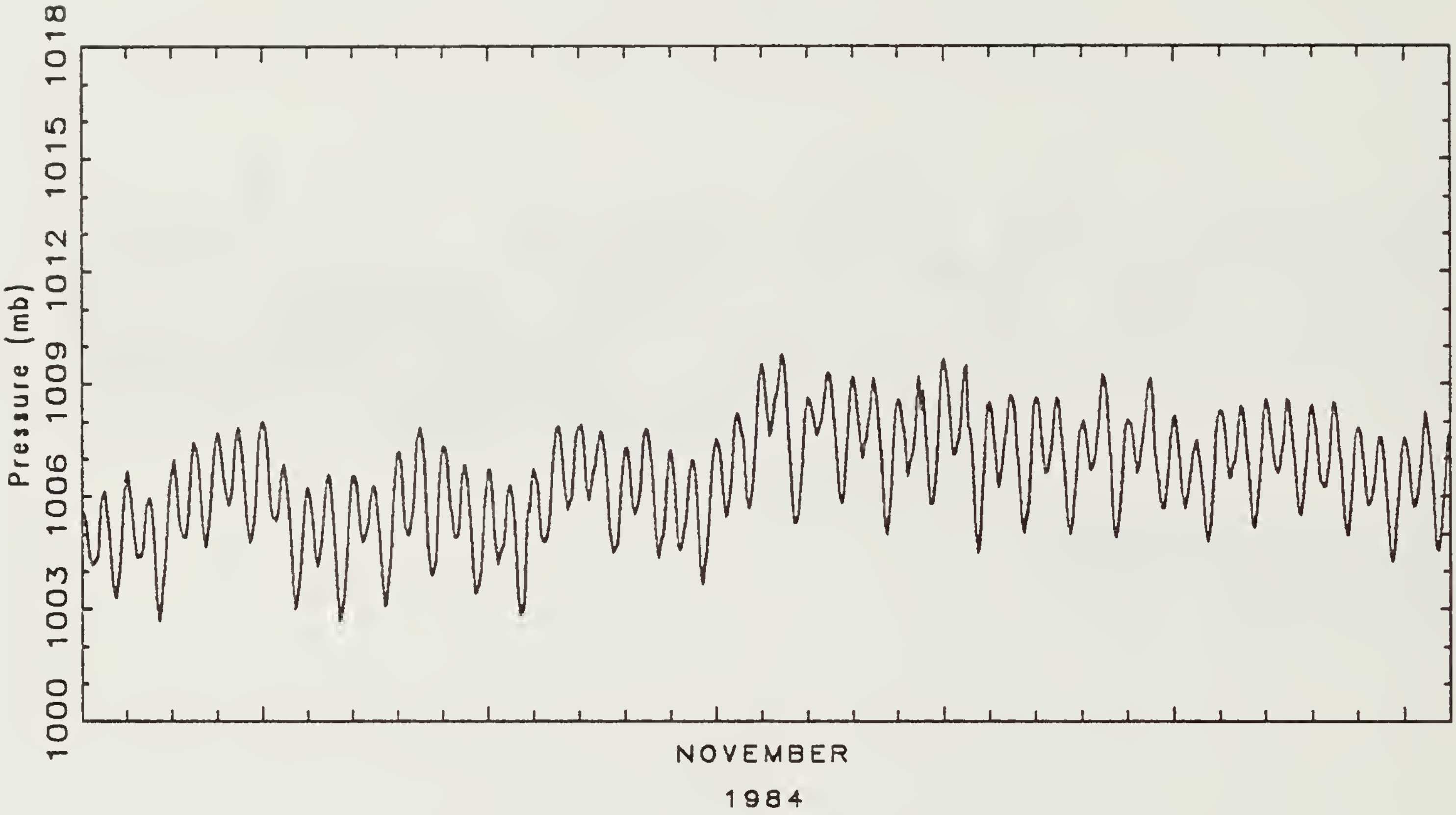

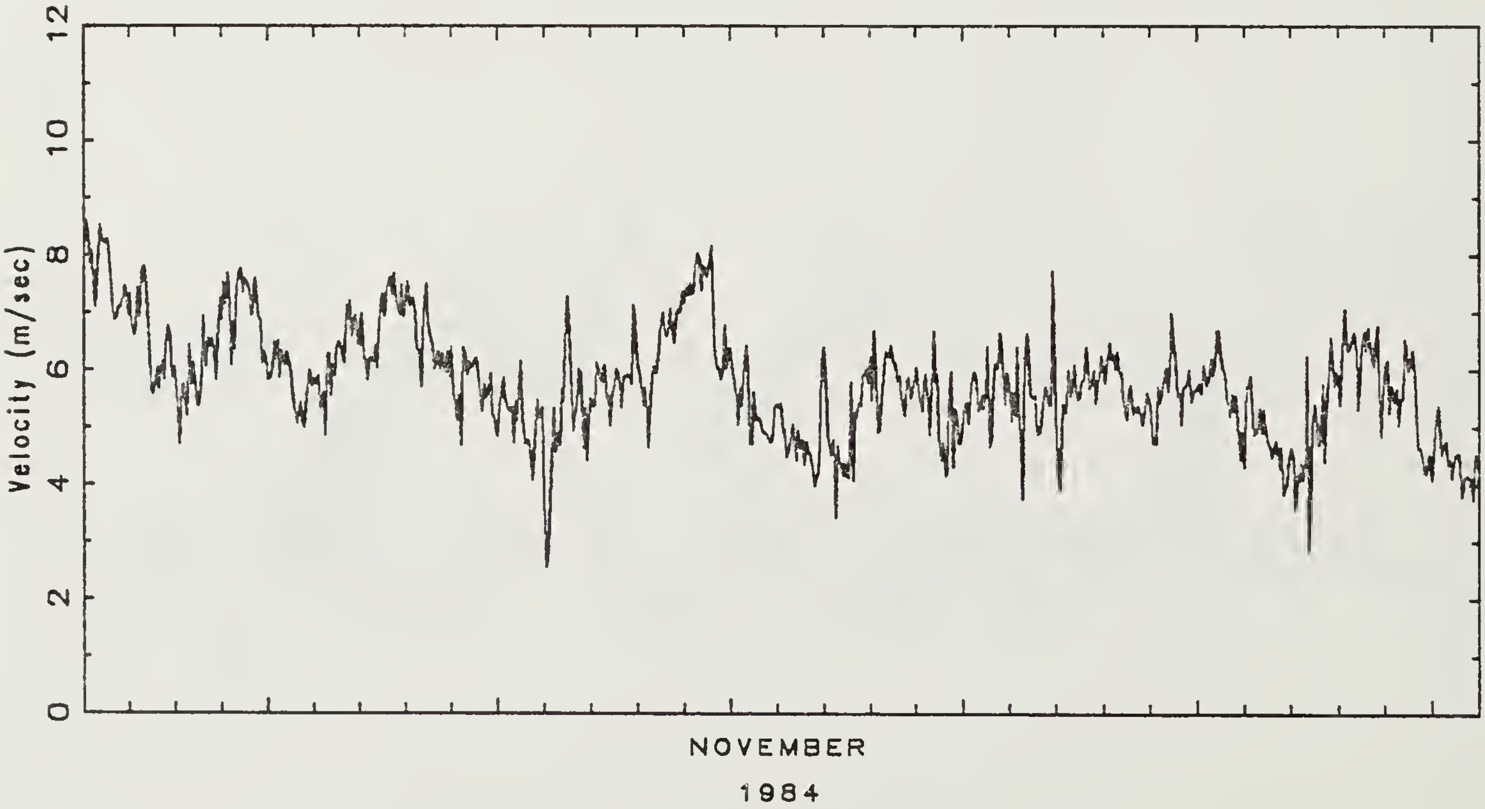

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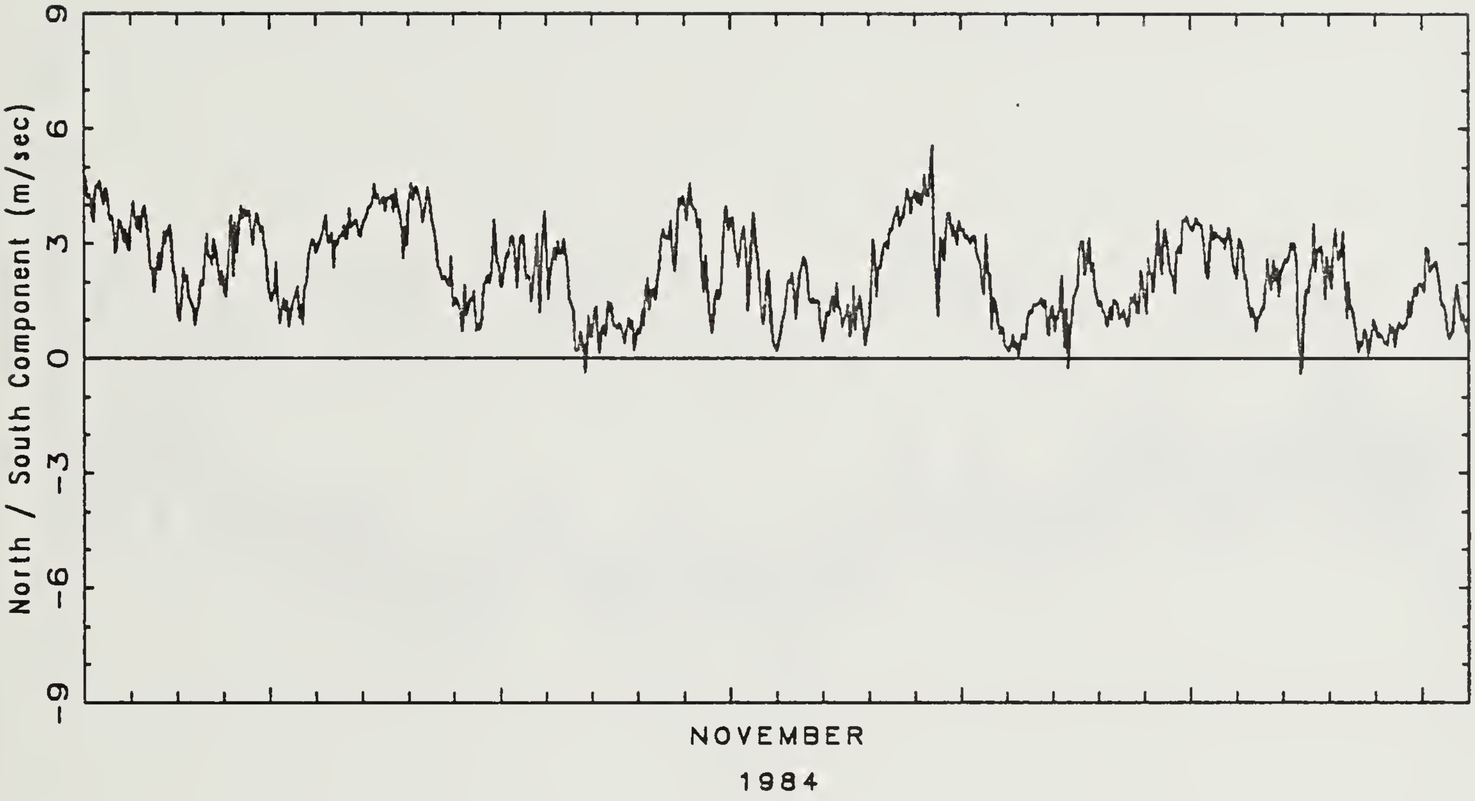

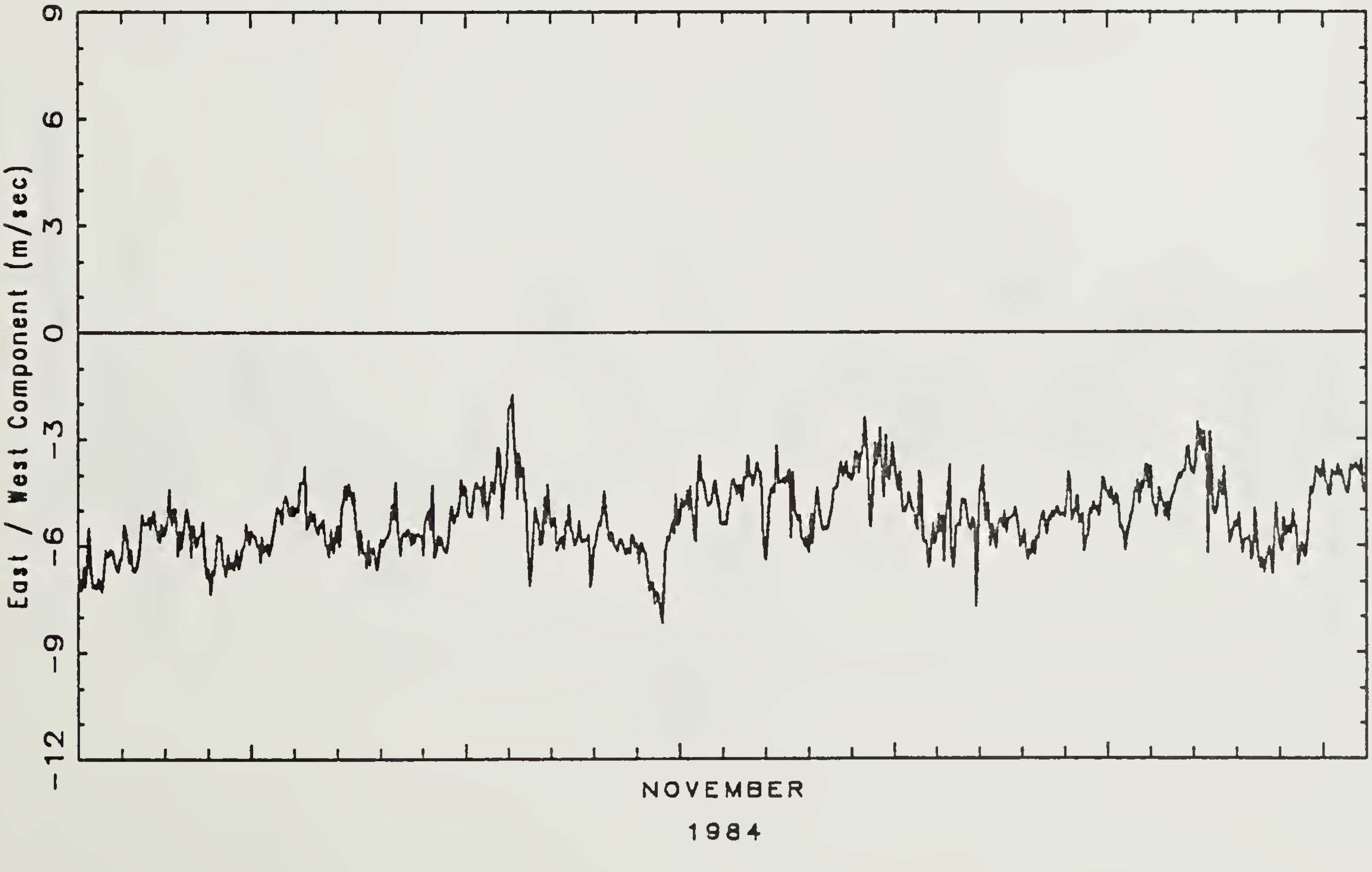

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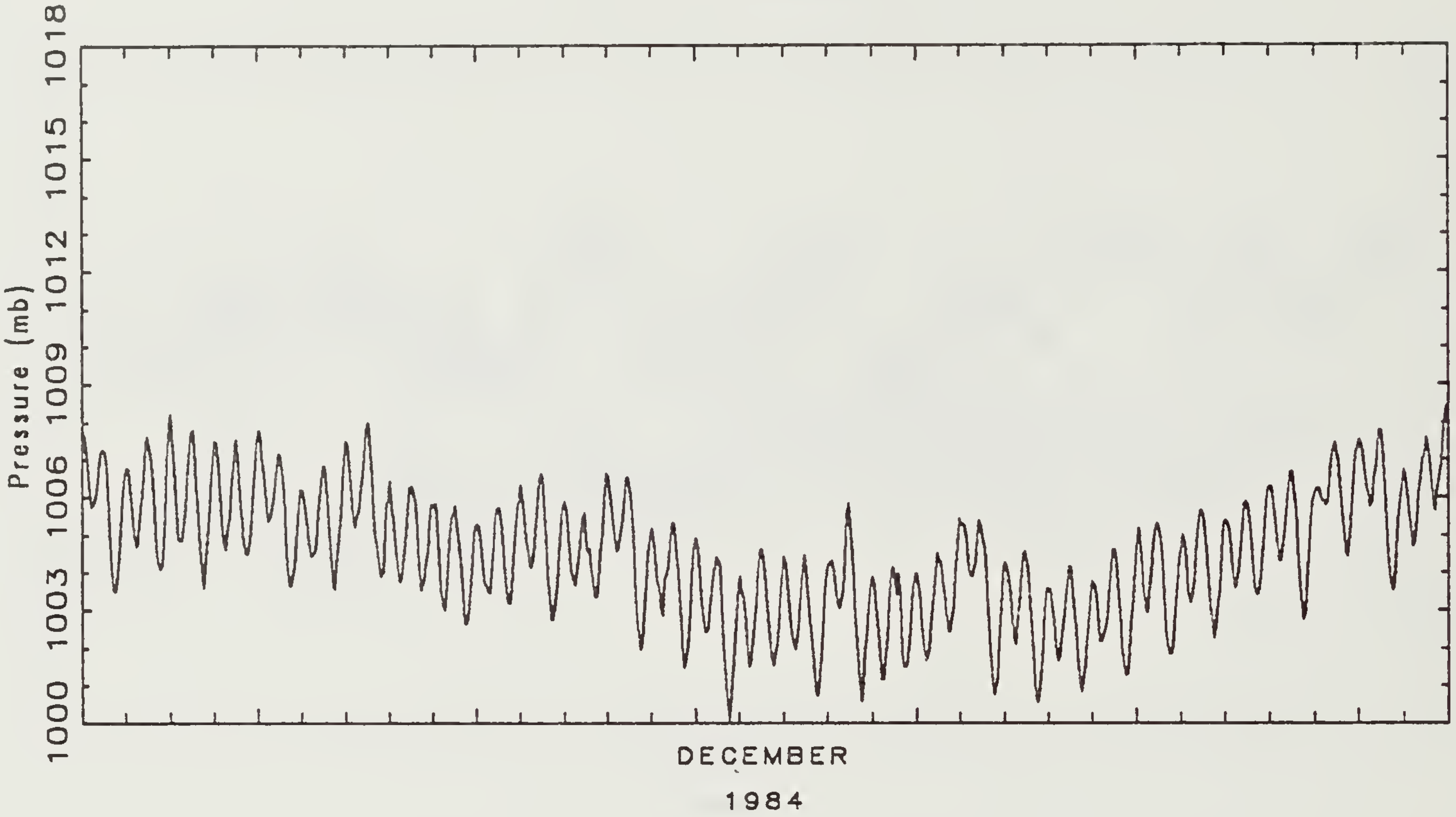

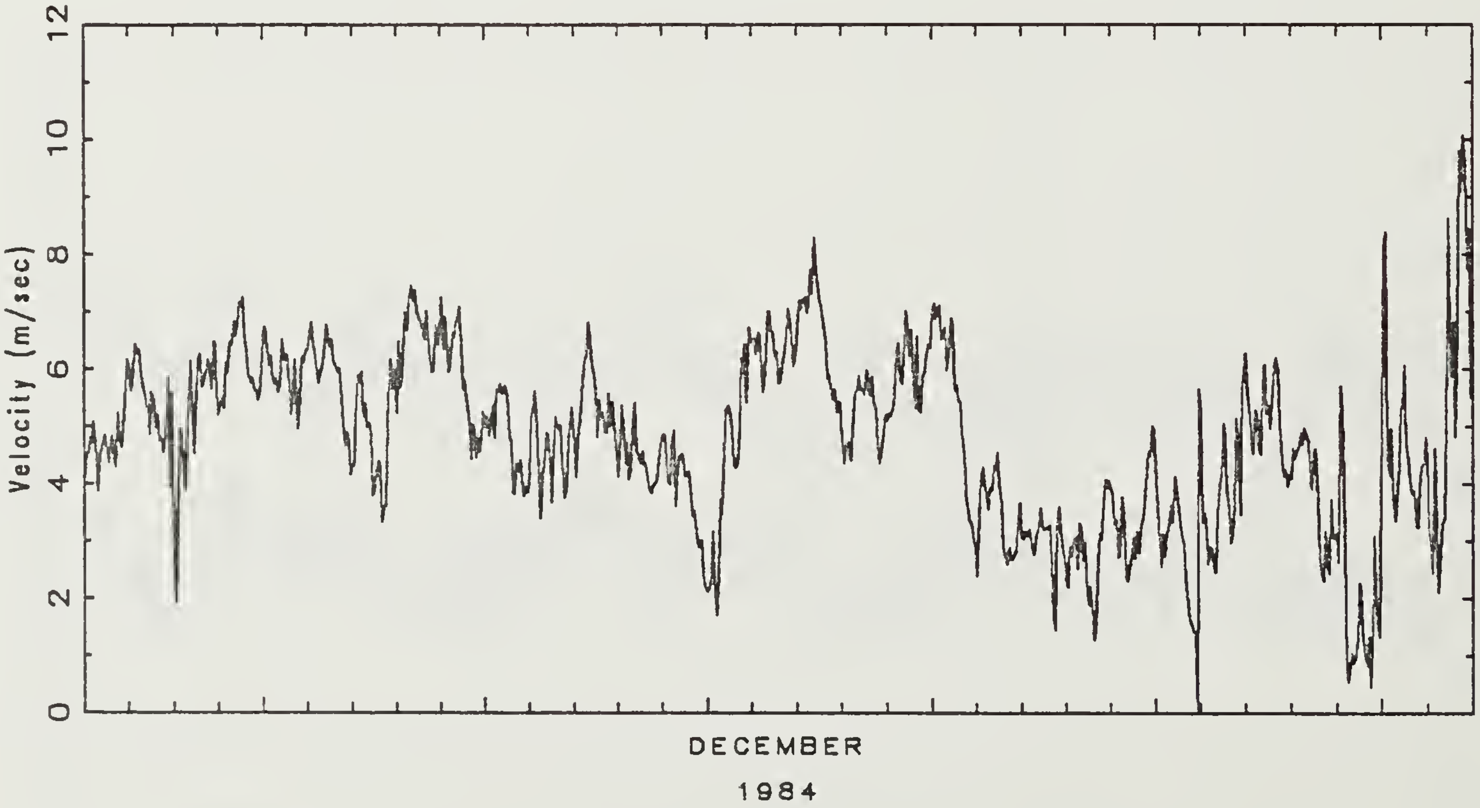

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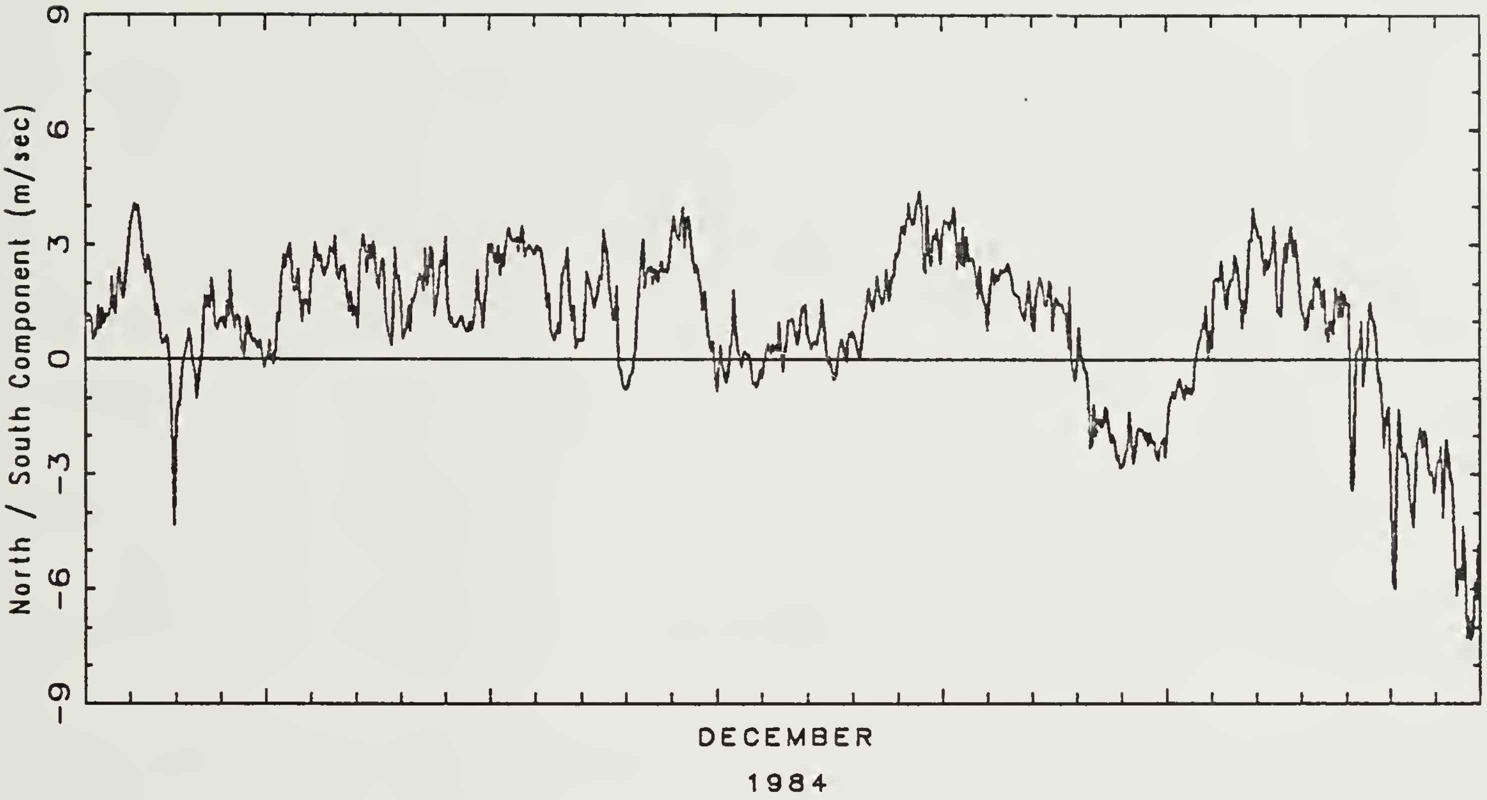

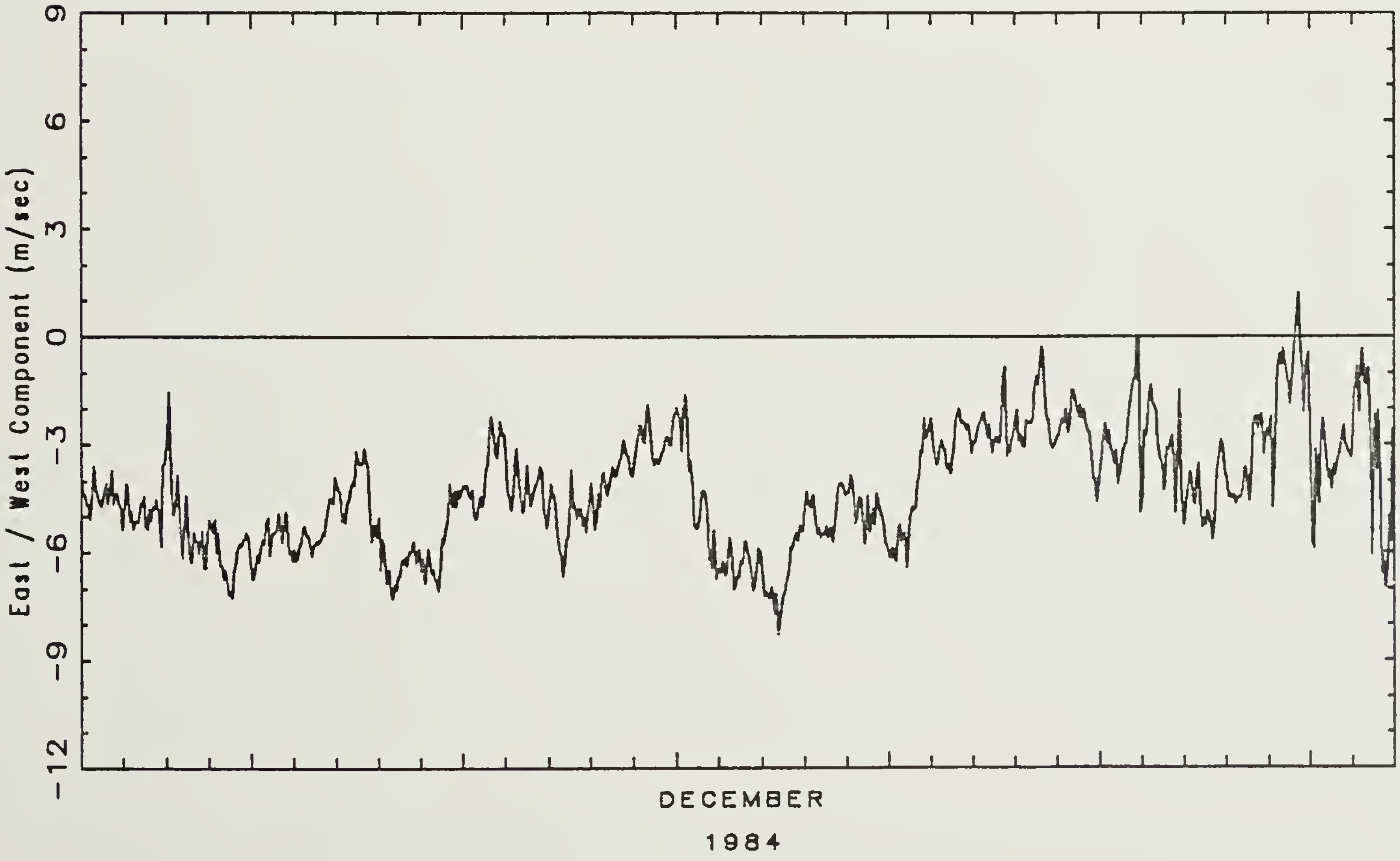

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